3D WORLD
THE MAGAZINE FOR 3D ARTISTS

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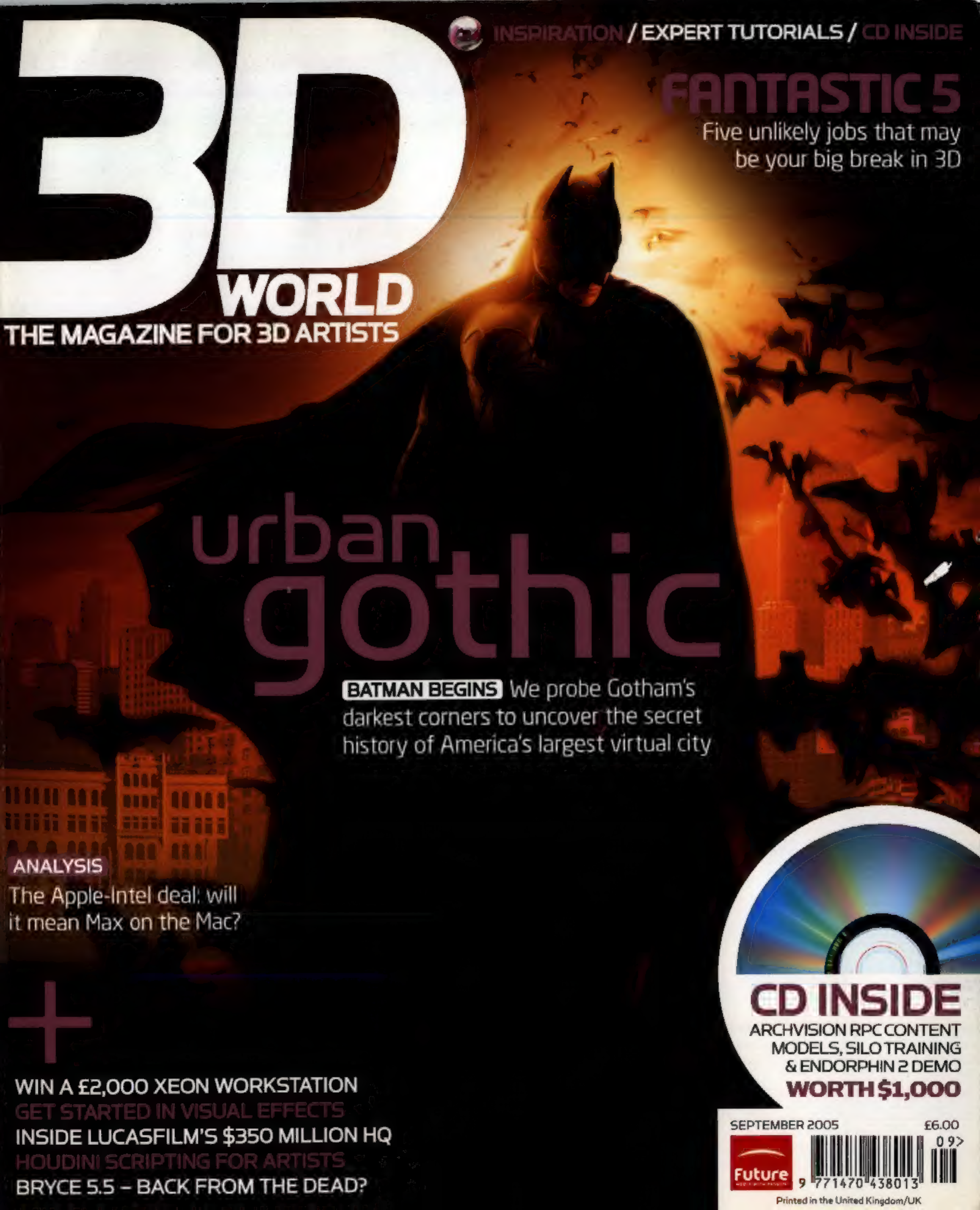

FANTASTIC 5
Five unlikely jobs that may be your big break in 3D

urban gothic

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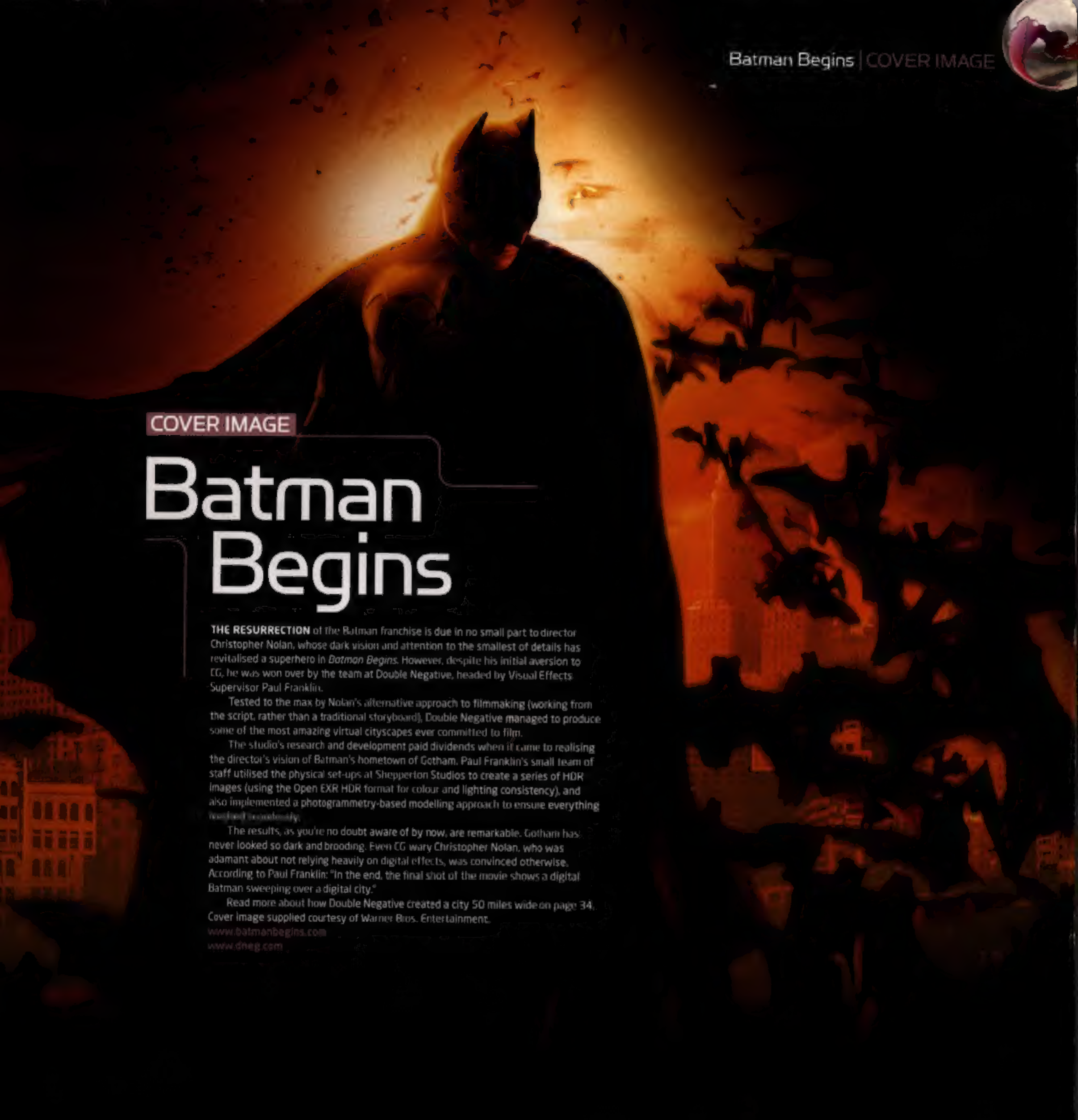

COVER IMAGE

Batman Begins

THE RESURRECTION of the Batman franchise is due in no small part to director Christopher Nolan, whose dark vision and attention to the smallest of details has revitalised a superhero in *Batman Begins*. However, despite his initial aversion to CG, he was won over by the team at Double Negative, headed by Visual Effects Supervisor Paul Franklin.

Tested to the max by Nolan's alternative approach to filmmaking (working from the script, rather than a traditional storyboard), Double Negative managed to produce some of the most amazing virtual cityscapes ever committed to film.

The studio's research and development paid dividends when it came to realising the director's vision of Batman's hometown of Gotham. Paul Franklin's small team of staff utilised the physical set-ups at Shepperton Studios to create a series of HDR images (using the Open EXR HDR format for colour and lighting consistency), and also implemented a photogrammetry-based modelling approach to ensure everything meshed seamlessly.

The results, as you're no doubt aware of by now, are remarkable. Gotham has never looked so dark and brooding. Even CG wary Christopher Nolan, who was adamant about not relying heavily on digital effects, was convinced otherwise. According to Paul Franklin: "In the end, the final shot of the movie shows a digital Batman sweeping over a digital city."

Read more about how Double Negative created a city 50 miles wide on page 34. Cover image supplied courtesy of Warner Bros. Entertainment.

www.batmanbegins.com
www.dneg.com

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3D World is brought to you with the help and advice of leading 3D industry figures

SHELLEY PAGE

European Representative, DreamWorks Animation

Shelley Page started her career in feature animation as Backgrounds Supervisor on Disney's *Who Framed Roger Rabbit?* She was one of the first artists hired to form DreamWorks Animation in 1995. She's now DreamWorks' European Representative, resourcing new talent for the studio.

www.dreamworks.com

JORDI BARES

Senior 3D Animator, The Mill

Jordi Bares worked for eight years in the games and film industries in his native Spain before moving to London in 2000, where he has freelanced at Jim Henson's Creature Shop and Passion Pictures. The winner of many awards, he was nominated for an Emmy for his work on the BBC documentary *Pyramid*.

www.the-mill.com

ANDREW DAFFY

CGI Supervisor, House of Curves

Andrew Daffy has worked in the CGI industry for ten years on projects that have accumulated over 30 awards. He was recently named one of Alias's *Maya* Masters for 2004. His new company, The House of Curves, will act as both a studio and a training school.

www.thehouseofcurves.com

ALEX MORRIS

Director, Hayes Davidson

Alex Morris qualified as an architect in 1990 and joined the architectural visualisation agency Hayes Davidson in 1996, having completed over 40 buildings across a number of sectors. He is responsible for many of HD's landmark images, including the UK's Millennium Dome and the Tate Modern art gallery.

www.hayesdavidson.com

JOLYON WEBB

Principal Artist, Codemasters Software Company

Jolyon Webb moved into developing game art after years as a freelance illustrator. He works at leading videogame studio Codemasters as Principal Artist in the Central Technology Group, which is the company's internal research and development team.

www.codemasters.co.uk

AARDMAN ANIMATIONS

Scott Pleydell-Pearce, Bobby Proctor and Stefan Marjoram

Respectively CGI Animation Head of Department, CGI Lighting/Technical Head of Department and a Creative Director for the commercials department, Scott, Bobby and Stefan have over 20 years' combined experience at Aardman, working on a range of award-winning ads, idents and short films.

www.aardman.com

Editor's perspective

Assuming that you're reading this when the issue first comes out, there's a good chance that you've just graduated from a 3D course - and that means you're probably about to send your demo reel out to potential employers. (If the issue came out a long time ago, either you should have a word with your postman, or your dentist has a seriously strange taste in magazines.)

If this is the case, stop now. Cease. Desist utterly. Throw the reel in the bin if you have to. (Your first-year assessment should come out for a start, as should that hilarious *Star Wars* parody. And the whole thing needs to be at least a minute and a half shorter.) Because before you write off to anyone, you really should finish reading this column. It could make you up to 50 times more likely to land a job.

Each week, I get at least a couple of emails from people asking for advice on how to get into the 3D industry. This means that in the time I've been working on the magazine, I must have received around 350 such requests. Of these, the vast majority were from people who wanted what might be termed 'conventional' 3D jobs – modelling, animation, texture work and so on. No more than five were from people interested in careers like matchmoving or technical direction.

Now consider a movie like *Batman Begins*. I've picked it because it happens to be on the cover this month, but I've no reason to believe that it isn't typical of the industry. The standard source of information on such matters, the Internet Movie Database (www.imdb.com), lists 190 people involved on the visual effects. Of those, 32 are compositors, 21 work in non-3D fields such as editing or stills photography, and 31 are senior staff: visual effects supervisors, heads of department and the like.

That leaves 106 jobs that a recent 3D animation graduate could reasonably apply for. Of those, 62 are indeed modellers, animators, texture painters and those mysterious generic folk described only as 'digital artists'. The rest write scripts, or rotoscope background footage, or simply help out with production. Which means that of my 350 emailees, 345 are competing for 62 available jobs – but the remaining five are competing for 44. I'll leave you to do the maths.

Okay, so you don't want to work as a roto artist for the rest of your life. That's fine. You don't have to. But starting out as one will allow you to get your foot in the door of a major studio, and once you're in, it's much easier to move sideways. Still not convinced? Then check out the article on 61. In it, you can read profiles of five such 'undercover' jobs within the 3D industry, and where each one can lead you.

Incidentally, I wasn't joking about your showreel: it really does need to be shorter. Plus, you should lose the bit with the TIE Fighters. Even if it is called *Episode VII: The Sith Hits the Fan*. Trust me on this one.

JIM THACKER Editor
jim.thacker@futurenet.co.uk

LETTER OF THE MONTH

We thought you might like to know that partly as a result of you printing our letter about our little movie, *Dominator*, pipping *Valiant* to the post of First Full-Length British 3D Animated Film [Mailbox, Issue 65] the backer of the aforesaid pigeon epic, Baker Street Media Finance, is now putting up the budget for a big-bucks revamp of our original film! This isn't the result we expected, but it just shows what can happen - and that you never know who's reading *3D World*.

The original cast and crew are back, with some very special guest stars booked on vocal duties. We're currently working on the animatic for the new movie, as well as wrapping a special 10-minute crossover between *Dominator* and characters from the two *Heavy Metal* animated movies. We're looking forward to bringing our particular brand of animated mayhem to a wider audience, and really can't thank your magazine enough for giving us the exposure that has been so crucial in getting things to this stage.

Further information about the film can be found on our website at **www.rengamedia.com**, and details on Baker Street Media Finance are at **www.bakerstreetfinance.tv**.

Tony Luke | Renga Media

There you have it: proof positive that promoting your work in *3D World* really does pay dividends (advertisers, please take note). Long-term readers may recall that we also featured the Crazy Frog animation on the cover CD of issue 50, long before he became a global celebrity - but honestly, that was a mistake anyone could have made...

Congratulations to Renga Media: in addition to $2 million in seed funding, a copy of the new *Exposé 3* digital art book is on its way to you in the post. We'll be keeping you updated on the team's progress over the coming months.

● The last time this still from *Dominator* appeared in Mailbox, Renga Media received $2 million in funding for its next film. We really should start charging for our services...

LETTER OF THE MONTH

Congratulations to Tony Luke, who wins a copy of *Exposé 3*, published by Ballistic Publishing. The third in a series of annual surveys of the world's best new digital artwork, this coffee-table book contains 208 pages of imagery, featuring the work of 181 of the industry's leading artists. The content spans the worlds of 3D, game design, digital illustration and architectural visualisation.

www.ballisticpublishing.com

DELIBERATE BIAS?

> Having just finished reading issue 66, I'd like to point out two inaccuracies in the issue that seemed to me more like deliberate bias.

Firstly, your pie-chart person [Feedback, page 17] needs to understand that a difference of five per cent between *3ds Max* and *Maya* can't result in a pie in which *Maya*'s slice is over twice as large as *Max*'s.

Secondly, the last line of the *Max 7.5* update says that this upgrade is particularly appealing to architectural professionals, when in fact the big addition is Hair and Fur, which is obviously going to be a lot more appealing to character modellers.

Jonathan Gould | Via email

We confess: we did the maths wrong. Having re-measured the pie chart, the *Maya* slice is around 15 degrees out, although it's certainly not twice as large as *3ds Max*. On the review, Pete Draper comments: "More of the new additions in version 7.5 were geared more towards architectural visualisation than any other market sector, hence that closing statement. However, as artists who have used *Max* for a while will know, those tools can also be used in other industries. I work in the effects industry and use the *mental ray* and Adaptive Subdivision features regularly."

PIPE DREAM

> I really love all the tutorials, tips and industry information that *3D World* provides. But there is one thing I'd like to see getting more coverage in the mag, even though the subject might seem a bit prosaic: how to set up a proper production pipeline!

● **Our duplicitous infographic from Pre-viz in issue 65. Multiply 35% *Maya* usage by 360°, divide by *3ds Max* and subtract the number you first thought of. No, hang on...**

I'm thinking of things like: how to set up coherent directory structures, bringing together all of the different applications used in the creative process and their associated data formats; meaningful file-naming conventions, incorporating information about clients, projects, scenes and versions; ideas about setting up and maintaining custom media libraries for sound effects, mo-cap and stock footage; and the ways in which all of these vary according to team size and project type.

It's clear that there's no definitive answer to these questions. However, a little bit of insight from people who are actually working in the industry could prove mighty helpful. As I said earlier, it's not the sexiest topic around, but I certainly ~~think it's one~~ that should receive some more attention.

Mario Hunstorfer | Via email

Production pipelines may not be the most headline-grabbing of topics, but we recognise that this is an important issue for anyone considering setting up their own studio. If you would like to see more coverage of the subject in *3D World*, send your feedback to the usual address and we'll consider running an article in a future issue.

AD IT UP

> I've been working as a 3D animator for over ten years now, and have completed jobs for clients in various fields. However, I'm now the director of a company, which means that I'm currently responsible for more than the animation alone – I'm also responsible for sales and the co-ordination thereof.

Although we don't have a large advertising budget, we have to start the ball rolling somewhere. I value *3D World* and look forward to the articles and tutorials that the magazine contains, but I would welcome some extra coverage of this area of the animation business.

Could you give us some feedback as to the best ways in which we can develop our advertising and marketing strategy, and how much it would be likely to cost?

C Leaf | Sovereign Multimedia

Promoting a new studio is a topic we touched on in our Business End section in issue 64, and it's one that we hope to return to in the coming months. Regular readers may also remember our article on marketing your own work that featured in issue 42. This article is now available as a free download from the In Depth section of our website, and can be found on www.3dworldmag.com.

TIE-BREAKERS ARE ANNOYING BECAUSE...

> I know that the competitions in *3D World* aren't that important. I know that they're not the reason I buy the magazine. But I still for the life of me can't understand the reason why tie-breaker questions are always added onto the end.

Usually, these tie-breakers are in the form: 'I would like [insert name of prize] because...' Because I want it! What other reason do you need?

Take, for example the tie-breaker in issue 66. The prize is one of 20 *Maya* training books. You have the competition question in there, which is fine. However, you then have the tie-breaker: "If I won a copy of one of the books, I would use it to..." Hmm. Now I wonder what someone using *Maya* would possibly do with a *tutorial* book?

Hermit | Via the forum

win!

Win superb Maya training resources

● Tie-breakers are a legal requirement, even when they don't involve otters, weasels and other mustelid madness

Stop the leg of the table wobbling? Deter muggers on the underground by reciting chunks of MEL script in a low and menacing voice? Deflect speeding bullets and other assorted projectiles that are no larger than 8x10 inches in size?

But no: the simple reason that we add tie-breakers to competitions is that UK law compels us to. Either we make them pure contests of skill, or else we have to remove the questions entirely.

Incidentally, the best tie-breaker never to appear in *3D World* was: 'In a fight to the death, who would win: a ninja otter or a weasel with a bazooka? Supply pictures.'

The question, which was written by a freelance sub-editor, survived two rounds of fact-checking before being spotted by the prize provider and removed on the day the page was due to go to press...

DO THE MATH

> In the introduction to the *Star Wars* article [Issue 66, page 31] it says that the movie took over 6,000,000 hours to render. Is that a misprint? Unless I'm making a major mistake, that would be six centuries. I knew that these things were processor-heavy, but somehow this doesn't seem quite right...

Kiri | Via the forum

Had all 2,151 visual effects shots from *Star Wars: Episode III - Revenge of the Sith* been produced on a single laptop, they would indeed have taken over six centuries to render. However, since Industrial Light & Magic's render farm contains well over 1,000 separate processors, 6,598,928 hours of render time works out as a matter of months of real time. Of course, we're not always above misprints, as the letter below demonstrates...

3DW PWN3D!

> The Softimage ad on page 21 of issue 65 appears to have been written in L337. Heh, you guys ROXXOR!

sway | Via the forum

Due to gremlins in the system, characters in the text of the advert became transposed between the *3D World* office and the printers, resulting in such typographic gems as: "On Supervolcano, *Softimage|XSI* particle effects allow8 us to refine an8 integrate CGI with live action." Exterminators have now been called it to deal with the infestation. Don't you just h8 it when that happens?

● While our article in issue 66 may seem to suggest that rendering on *Star Wars: Episode III* began some time in the 15th century, this is not actually the case...

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SPECIAL THANKS THIS ISSUE
Blackened chicken, Warner Bros's friendly PR team

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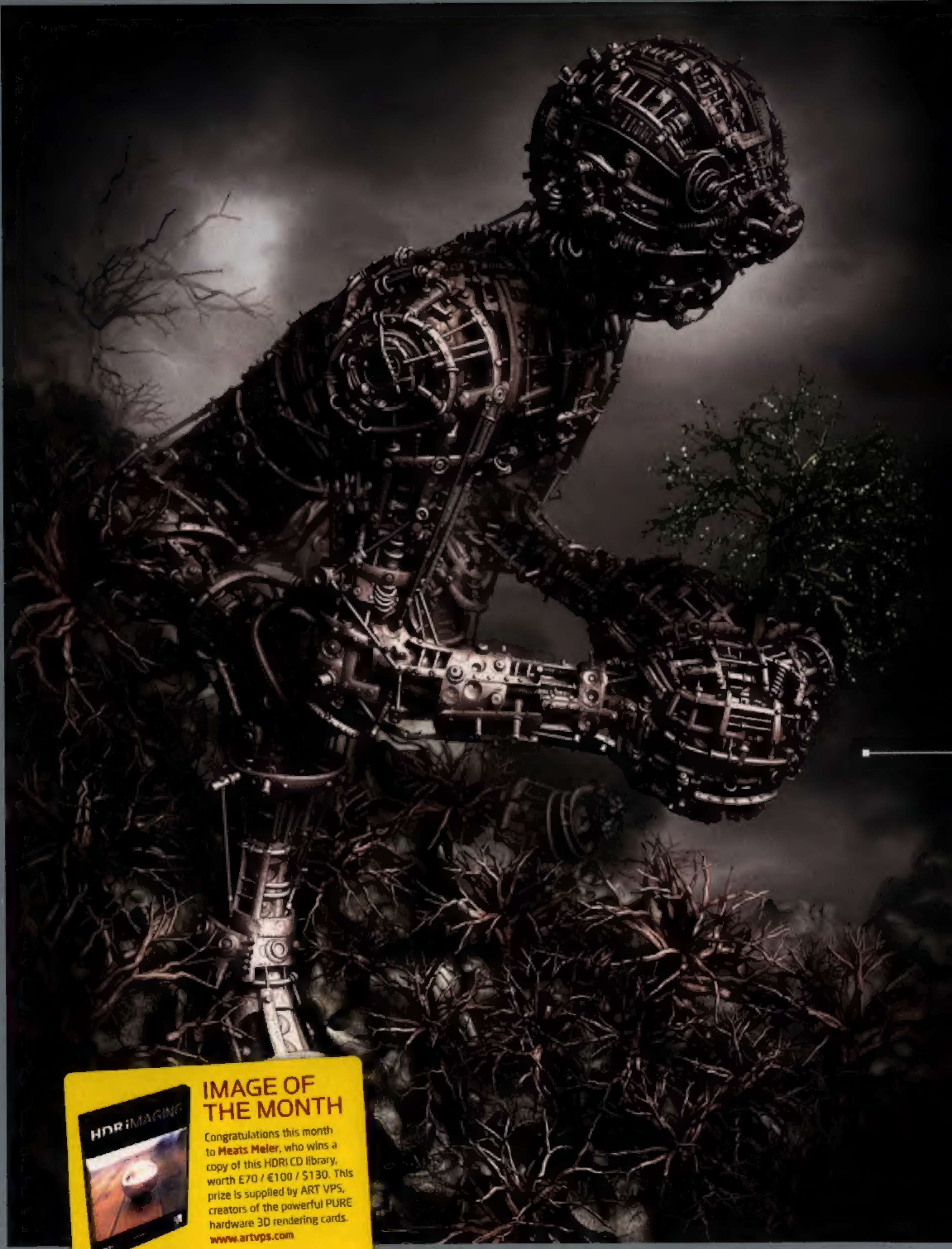
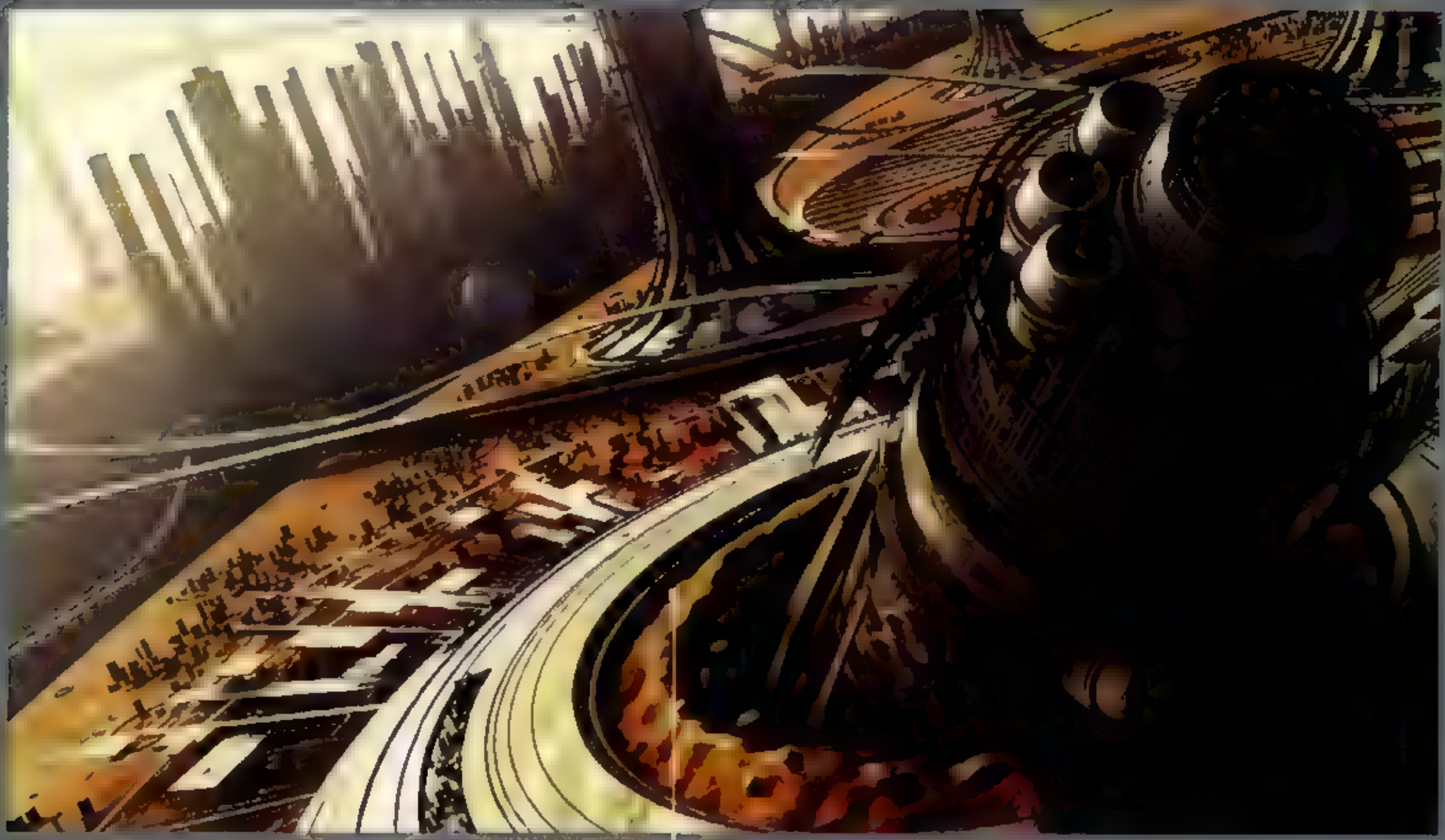
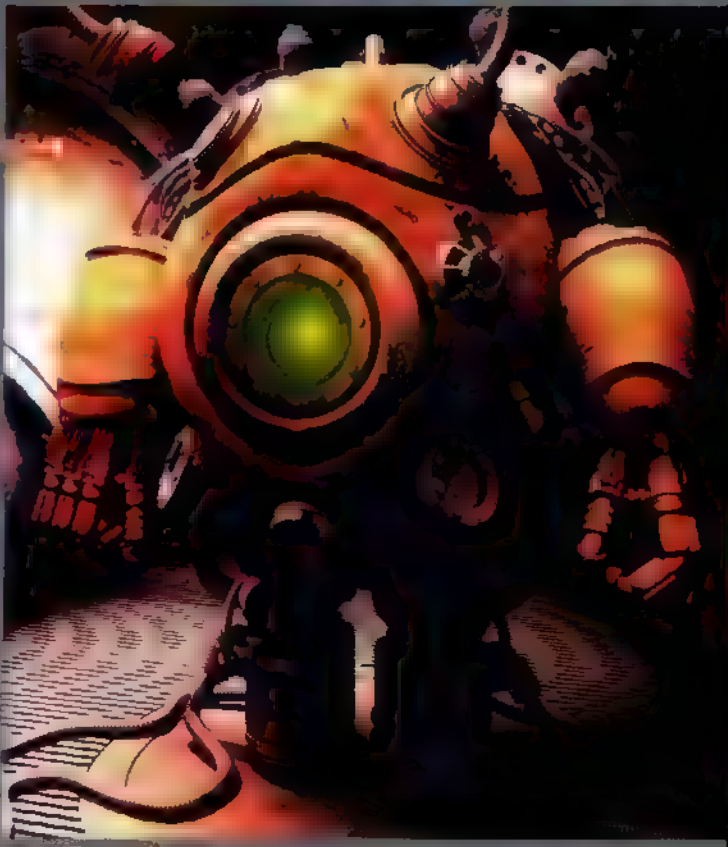


IMAGE OF THE MONTH

Congratulations this month to **Meats Meier**, who wins a copy of this HDRI CD library, worth £70 / €100 / $130. This prize is supplied by ART VPS, creators of the powerful PURE hardware 3D rendering cards.
www.artvps.com





[redacted]S MEIER **The Last of the Leaves**
[redacted]

"*ZBrush* was used exclusively to model and render this image, which contains many millions of polygons. I am a resident artist and instructor at the Gnomon Workshop, where I teach the *Maya* class and the first ever *ZBrush* class, as well as creating tutorial DVDs. I have been a digital artist for over ten years now and my long-term goal is to create a feature-length film completely by myself, and so I'm continually studying all the necessary skills to ensure the completion of this dream. In 2003 I was named a Maya Master by Alias at the SIGGRAPH show."

[redacted]
[redacted]rtSpace.com

HODONG LA **Warfare and Harmony,**
[redacted]
3ds max 6.0, Brazil, Photoshop

"[redacted] University and since I graduated in 2003 I've been working as a designer at a design company and an illustrator at a games development company. I'm [redacted] of visual images. The most important part of my work is the concept – I don't worry about the technical part. *The Mechanical Venus* refers to the Venus sculptures of the Paleolithic age. The *Warfare and Harmony* image was created as my entry for the Grand Space Opera Challenge on CGTalk.com."

[e] ohbaby78@hotmail.com
[w] www.hodings.com

ALEX YORK [illegible]

Softimage|XSI, Photoshop

"I'm a recent Computer Animation graduate from the University of Teesside, currently living in London. My primary focus is on lighting but the main challenge I come across every day in CG is, unsurprisingly, the render time – how to achieve the look and quality I'm after within an acceptable time. Aesthetic choices are usually made through finding a balance between realism and the style that I'm trying to portray. I've recently started a full-time job at architectural visualisation firm Hayes Davidson, working as an arch-viz artist"

[e] alex@alexyork.co.uk
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MIGUEL [redacted]
Maya, Photoshop

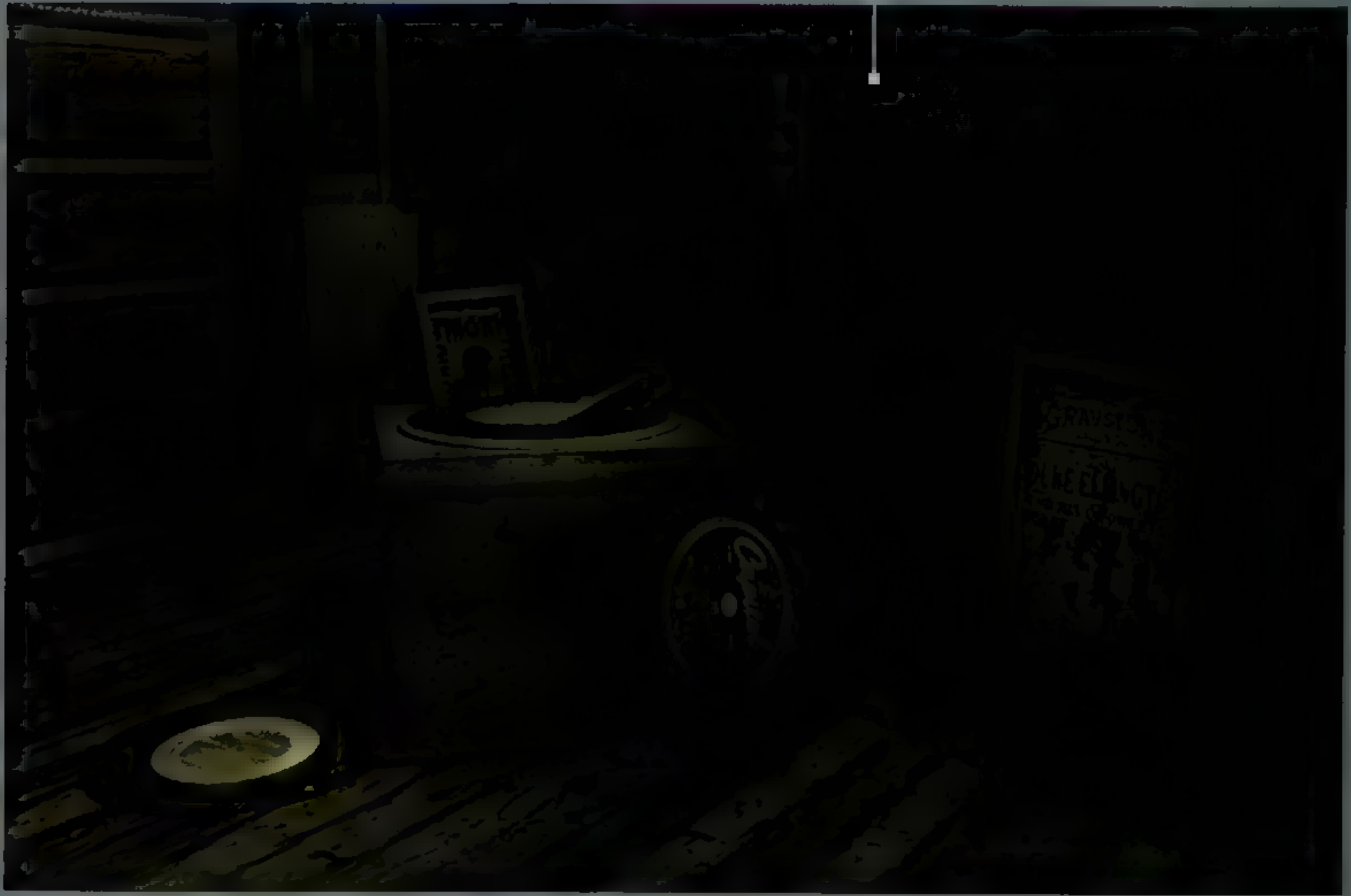
“I was bo[redacted] 1982 inspired by Nintendo and '80s cartoons. I followed my strength in art [redacted]ed of nothing more. After being introduced to the new era of 3D [redacted] was what I wanted to do with my life. I enrolled [redacted]ation in November 2001, and graduating with a fully accredited Associate of Science degree just provided me with even more desire to carry on wit[redacted].”

[e] [redacted]
[w] www.digiteck3d.com

OPINDER CHAGGAR Record Player, Duke (Distant Memory)
[redacted]

“I'm a graduate of Bournemouth University, where I completed a Masters course in 3D animation. Prior to that, I studied animation at Teesside University. *Distant Memory* is a short film I'm working on in my spare time. It's about a famous jazz artist who remembers his band and the days spent playing at a local club. As he remembers this, his band members disappear one at a time to show that nothing really lasts.”

[redacted]r187@hotmail.com
[w] www.cgopi.com



Send us your exhibition images | For postal address, see page 9

PÄR TINGSTRÖM Monkey On Your Back

Maya, ZBrush, Photoshop

"I'm 27 years old and live in Uppsala, Sweden. I work at Starbreeze Studios as a Senior Artist and have done so for the last seven years. This image was created for a challenge at CGTalk.com called 'Master and Servant'. The task was to create a character-driven image and it needed to include at least one human. The basic idea was to create some kind of person or robot/android in a submissive and suffering pose, with tubes and cables attached to it. It then evolved into some kind of bizarre test room for battle droids. The droids are made with polygon tools smoothed with the *Active Smooth Poly* script. The guards in the background are base modelled in *Maya* and then worked over in *ZBrush*."

[illegible]

[illegible]

ERRATUM #66

It's been brought to our attention that in issue 66's Exhibition, we printed the wrong information about artist Steve Clarke. Our apologies go out to Steve and we're happy to print his correct details here.

"I work as a freelance illustrator, creating images in both 2D and 3D. For the first four years of my career, I worked in 2D, creating images for books and greetings cards. Now the majority of the work I do is in 3D and for projects including books, magazines, websites, product visuals and concept artwork for games. All my work is done using *LightWave* and *Photoshop*. For more information or examples of my work, please go to the link below or contact me directly via email."

[illegible]

(w) www.portfolios.com/escelc

Assembled, by Steve Clarke, was featured in issue 66's Exhibition

PRE-VIZ

NEWS / OPINION / ANALYSIS

New 3D apps for Intel Macs?

HARDWARE Mac fans may see Apple's decision to switch from IBM to Intel processors as heresy, but will it open up the platform to a wider range of 3D applications? We polled the leading software developers

After a decade of using IBM's PowerPC chips for its computers, Apple has announced that all its future models will incorporate processors made by Intel. The first such machine is likely to be a new Mac Mini, launched in a year and so, and by the end of 2007 the entire product range will be Intel-based.

Publicly, Apple CEO Steve Jobs cited Intel's chip roadmap as being superior to that of IBM's, mentioning that company's failure to produce a 3GHz chip, as well as a G5 laptop-friendly version. But sources close to IBM believe it was a dispute about pricing that eventually swayed him, despite Jobs' previously enthusiastic evangelism of the PowerPC.

Although rumours of the transition had been circulating for a while, they had largely been dismissed as typical Apple smoke and mirrors. Anthony Frausto-Robledo is the founder and editor of Architosh (www.architosh.com), the Mac-focused web community for CAD and architectural users. "I was very surprised by this decision because technically the PowerPC is fundamentally superior to Intel's x86 architecture by virtue of design," he commented.

"PowerPC chips have traditionally been smaller and yet just as powerful, if not more powerful, than Intel Pentium chips, while consuming less energy. Moreover, the PowerPC platform had 64-bit processing in mind when it was created whereas Intel had to force-fit 64-bit instruction set handling [into their chips].

"The marketing part about who is faster was handled with typical Jobsian polish," he added. "He didn't say PowerPC chips are lacking today; he said the Intel roadmap looks so much better for the future. And in particular he mentioned energy issues."

What is certain is that all existing Mac software will need to be recompiled to function on the new platform, and this transition can be handled in one of two ways. Older software which isn't likely to be updated anyway can use *Rosetta* – essentially an interpreter supplied by Apple which translates PowerPC to Intel formats on the fly. This will obviously incur a speed hit and in fact only works with a limited number of applications (pre-OS X software isn't supported, for example), so it's not ideal.

The majority of Mac developers will instead opt to produce a so-called Universal Binary, which can run on both PowerPC and Intel chips. The complexity of this rewriting depends on how hardware specific the code might be. Apple's *Xcode* development tool, introduced with OS X, was built with this in mind, and OS X itself has been maintained in Intel-ready format at Apple for some time now.

> "WE ARE ALWAYS EXPLORING THE OPTION OF A MAC VERSION OF SOFTIMAGE|XSI"
>
> **GREGOR VOM SCHEIDT, VICE PRESIDENT, AVID**

"The newer sophomore generation of developers are already using Apple's *Xcode*, and thus can simply recompile with hardly any tweaks and be ready with Intel Macs right away," said Anthony Frausto-Robledo.

Indeed, certain developers, such as Luxology and Maxon, have already announced Intel-ready versions of their applications. "We had a programmer working on this immediately following Apple's announcement and within 20 minutes *modo* was not only compiled as a Universal Binary but actually running on the Intel-based Macs," said Brad Peebler, President of Luxology. Meanwhile, *Cinema 4D* – also an *Xcode* application, and according to Maxon, "over 95 per cent platform-independent" – is ready to go.

PLUGGED IN

CLARIFICATION

In the Projects Round-up section of issue 66, we featured a music video for Plaid. However, we neglected to mention that the CG work on the promo was created by Charlex, Inc. in New York, with Alex Weil as Executive Creative Director. Also, on page 29 of issue 67, we accidentally credited effects on the Sunsilk Monsters ad to Framestore CFC, rather than their actual creator, Glassworks. Our apologies to all those concerned.

www.charlex.com
www.glassworks.co.uk

● Hardcore Apple fans may see Macs with Intel inside as heresy – but will it make the platform more attractive to 3D developers?

[illegible] | Apple puts Intel inside

"What will differentiate Apple's Mac computers in the future will be largely the same things as today: ease of use, superior operating system, elegant and beautifully crafted hardware with deep software/hardware integration. Those are the things that matter most."

Anthony Frausto-Robledo, Editor, Architosh

"It's hard to guess what the PC/Windows market will be like [following the transition]. We have to assume that using the same processors on both platforms will make overall performance much more dependent on the software. At the very least, it'll be easier to compare both systems directly."

Marco Tillmann, Product Manager, Maxon

"The Intel-Apple announcement does not affect our strategy for Softimage in the short term; XSI for the moment remains focused on Windows and Linux. We see the primary challenges facing CG animation, post-production and games studios more in the area of empowering artists with tools that allow them to create better content."

Gregor vom Scheidt, Vice President, Avid Technology

So does the transition also mean you'll be able to run OS X on any PC? Officially, no. Apple has categorically stated that only its own hardware will run the OS, probably relying on some low-level BIOS checking to enforce this. It's also unlikely that Microsoft will release a Mac version of Windows. Of course, this sort of prohibition is like a red rag to a bull for some programmers, so unofficial and unsupported hacks may well surface in time.

More significantly, the transition also raises the possibility of porting existing Windows-only 3D apps to the new platform. *3ds Max*, for instance, has a quoted user base of 280,000 customers, but was designed solely for Windows and Intel platforms.

Developer Autodesk Media and Entertainment (formerly Discreet) has traditionally dismissed all suggestions of a Mac conversion due to the amount of work involved. Whether that may now change is, for the moment, a moot point: at the time of going to press, the company was unable to respond to queries on the likelihood of a port.

Other major developers were being equally non-committal. Because Alias already produces a Mac version of *Maya*, it appears to be examining its options. "We're encouraged to see Apple adopting an industry-standard processor and Alias is currently reviewing the technical implications," said Kevin Tureski, Director of Engineering for *Maya*. "We will work closely with Apple through this transition."

Gregor vom Scheidt, Vice President of Computer Graphics at Avid, echoed these sentiments. "We're always looking how to meet the needs of our customers, and that includes exploring the option of a Mac version of *XSI*, which is certainly technically feasible," he said. However, he also added that there were no such plans at the moment.

So despite the predictable outcry from the halls of Macademia, it appears to be business as usual – at least in terms of 3D software. As one blogger noted: "From an end-user perspective, it's as if Coca-Cola changed its sugar supplier as far as I'm concerned."

www.apple.com, www.intel.com

FEED› ‹BACK›

We want to hear from you on the issues affecting 3D artists, so from now on, once you've read our main news story on the facing page, why not visit our forum and post your reaction to it online? This issue's question concerns Apple's transition from using IBM PowerPC chips to those supplied by Intel.

Reaction to the news has ranged from outraged cries of blasphemy to the equivalent of 'ho hum'. Although all Mac software will need to be recompiled, OS X remains an Apple-only product.

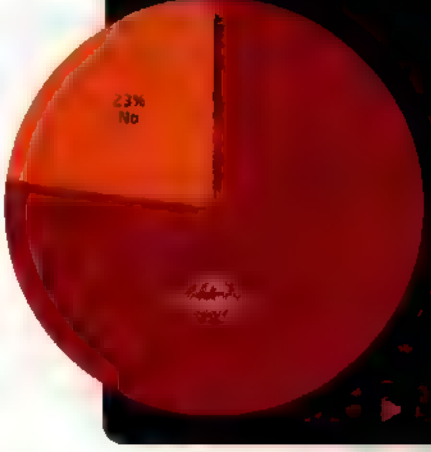
This month, the question up for debate is: "Do you think Apple's decision will affect the 3D software market in the long term?"

- ● **Certainly** – it has effectively eliminated the technical gap between the two platforms, which is great
- ● **Maybe** – depends greatly on pricing, performance and many other factors
- ● **Unlikely** – perhaps for smaller developers, but not for the average 3D artist
- ● **No** – Macs have always been a minority market for 3D, and always will be

Have your say | http://forum.3dworldmag.com

LAST ISSUE: THE VERDICT

"Would you join a professional CG body, either in the UK or European, that held some real power for its members?"



Pixar targets mass market

LAUNCH SHOW REPORT No longer the preserve of high-end effects houses, Pixar's industry-standard rendering technology has become available to the entire Maya community with the launch of the sub-$1,000 RenderMan for Maya. 3D World canvassed user opinions at the product's European launch

Pixar's European launch of *RenderMan for Maya* (*RfM* hereafter) took place this month at the Apple Store in London. Aimed at the mid-range 3D graphics market, the new product makes Pixar's core rendering technology available for under $1,000, and is targeted at design studios, architectural visualisation businesses and independent animators who want movie-quality images but don't necessarily need (or can't afford) the premium features of the $3,500 *RenderMan Pro Server*

Pixar claims *RfM* provides the highest-quality translation path of any plug-in renderer currently available for *Maya*. It takes *Maya* scene data such as lights, geometry, shading nodes, fur, particles, hair and Paint Effects and renders it directly into the *Maya* Render View window. Other effects found in *RenderMan Pro Server*, such as Global Illumination, motion blur, Subsurface Scattering, depth of field, ambient occlusion, displacements and anti-aliasing are also available.

Chris Ford, Business Director of Pixar's *RenderMan* Product Group, said *RfM* provided "push-button rendering capability for fast turnaround work" He emphasised the software was "not a 'lite' version," adding: "It is the full Academy Award-winning *RenderMan* product packaged in such a way as to make it far more accessible to a broader group of users."

There are some limitations in the *Maya* version, though. For instance, it's unable to read or write RIB files, DSOs (dynamic shared objects) for custom and procedural plug-ins are not supported; and the software is not optimised for multiprocessor or bucket parallel rendering. Also, because the renderer is a *Maya*-embedded plug-in, *Maya* is always resident in memory.

But will animators fork out for Pixar's offering when *mental ray* ships with *Maya* for free? *RfM* beta tester Rick Pumphrey is certainly sold (see below), but Tom Box technical director at London animation studio Blue-zoo – who admits he hasn't seen the software – is less convinced.

"We use *Maya's* internal renderer for most of our work unless a project requires *mental ray* for particular lighting effects," he explained. "Our next logical upgrade would be to use *mental ray* on our render farm, but we would look at other options if they were affordable. *RenderMan for Maya* sounds quite interesting, but how restrictive is it? At the moment we'd be looking to move to *mental ray* instead."

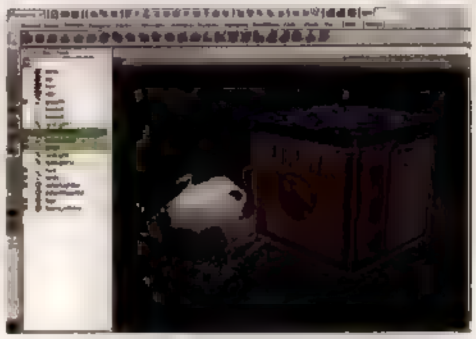
While *mental ray* enjoys strong momentum, there's also growing interest in third-party *3ds Max* renderers *Brazil r/s* and *V-Ray*, which are both likely to be ported to *Maya*. *RenderMan* could also be embedded into other 3D applications and Pixar may already be evaluating *3ds Max*.

Pixar recognises that it will have to step up its marketing for *RenderMan for Maya*, as Pumphrey conceded: "There's a heavy burden on Pixar to get the message out to the community that *RfM* is out, available and awesome."

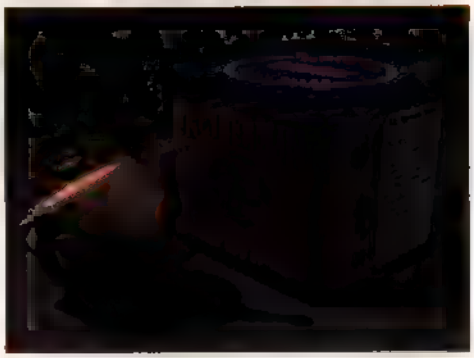
RenderMan for Maya costs $995 and is available to order now from Pixar's official website.

www.pixar.com

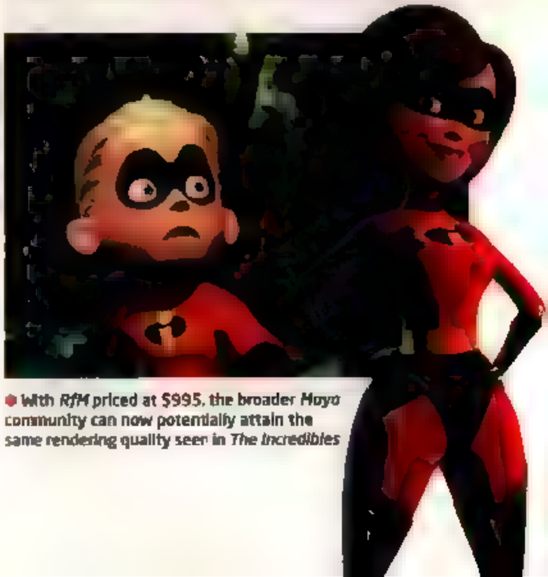
> "IT IS THE FULL ACADEMY AWARD-WINNING RENDERMAN PRODUCT, PACKAGED IN SUCH A WAY AS TO MAKE IT FAR MORE ACCESSIBLE"
> **CHRIS FORD, BUSINESS DIRECTOR OF PIXAR'S RENDERMAN PRODUCT GROUP**



● No rendering demo would be complete without a teapot, and a walking one at that. *RenderMan for Maya* integrates completely with its host program's rendering interface



● Motion blur, depth of field, displacement shaders, deep shadow maps, ambient occlusion, software rendered particles, Subsurface Scattering and more featured in Pixar's demo



● With *RfM* priced at $995, the broader *Maya* community can now potentially attain the same rendering quality seen in *The Incredibles*

[illegible] ...and pronounced "awesome"

Pixar granted 3D World an exclusive interview with beta tester Rick Pumphrey

● Pumphrey says his short movie, *Snowmen Crash*, couldn't have been created without the use of *RenderMan for Maya* and its advanced features

Rick Pumphrey, a freelance animator based in Georgia, USA, was one of the first animators to sign up for Pixar's *RenderMan for Maya* external beta testing programme.

Pumphrey has used *Maya's* internal renderer as well as *mental ray*, and has briefly experimented with *Turtle* from Illuminate Labs, but emphasises that he's "no rendering expert". Still, he knows only too well how difficult it is to achieve good lighting.

He rates *RenderMan for Maya* as "a great tool for independent or freelance animators," adding that the Global Illumination features alone are impressive enough – but the inclusion of Subsurface Scattering, deep shadows, motion blur and displacement mapping make the renderer all the more compelling.

He also believes that the rendered images not only look better than competing renderers but that animators "will get to the finished result a lot quicker because it doesn't take long to figure out how to do it".

Pumphrey admits it's unlikely he would ever have tried or purchased Pixar's high-end *RenderMan Pro Server*, but believes that *RenderMan for Maya* offers a very exciting proposition at a reasonable price and "brings more value to what I can offer a client".

www.blakestudios.com

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Get more info at:
www.maxon.net/lw

Teddy © davecollier3d [illegible].com

Projects round-up

This issue, we indulge in a romantic comedy, a monster BMW – and beer

01 TIMEBOMB COMMERCIAL

Chris Romano's *TIMEBOMB* is an ad for Santa Monica radio station KCRW, currently running in LA cinemas. "All the 3D and rendering was done in *Maya*. I lit everything with ambient light and point lights that only contributed a specular component – there's no shadow casting or diffuse lighting – also used Hypershade to put together an edge detection component, which shaded the geometry darker when it faced parallel to the camera. This gave the models a faux comic book outline. For the flatter, more graphic scenes, I removed the point lights altogether."
www.toonlets.com

02 MONSTER-IN-LAW VFX

"The idea was to create a seamless crane shot that starts in a Venice Beach boardwalk and moves left into an apartment. But the apartment isn't really in Venice Beach..." says Digital Dimension's Compositing Supervisor Leandro Visconti, describing the opening scene of rom-com *Monster-in-Law*. "We built plates, tracked them in 3D and devised a transition between them, using a palm tree at the head of the apartment plate as a wipe. We also 'dressed' a restaurant with a 3D terrace." *Digital Fusion* and *3ds Max* with *mental ray* and global illumination were used.
www.digitaldimension.com

[illegible]

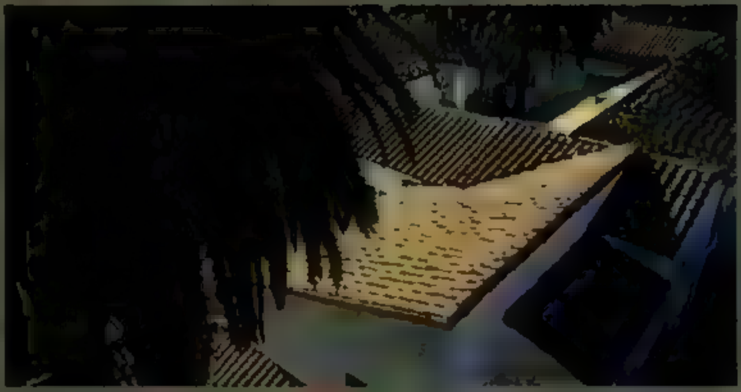
And now another monster. To advertise the new BMW M5, Studio aka devised a brilliant 60-second animation that is being distributed via email, web and DVD. "BMW wanted something that didn't feel like a car ad," says Philip Hunt, Creative Director of Studio aka, who turned 2D sketches into a 3D world. "The monster, set and car were all built in *Softimage|XSI*. We built a photoreal car and integrated it into an illustrative environment. It was great – like working with a 3D sketchbook of raw artwork. We suggested an eerie soundtrack, and it works a treat."
www.studioaka.co.uk, www.roadmonster.co.uk

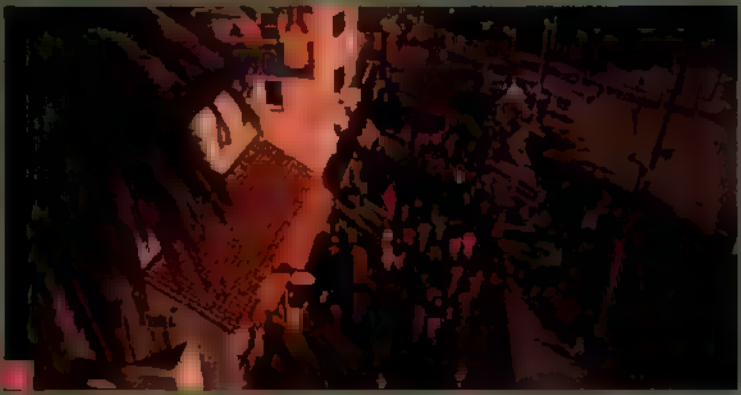
04 PIONEERS PROMO

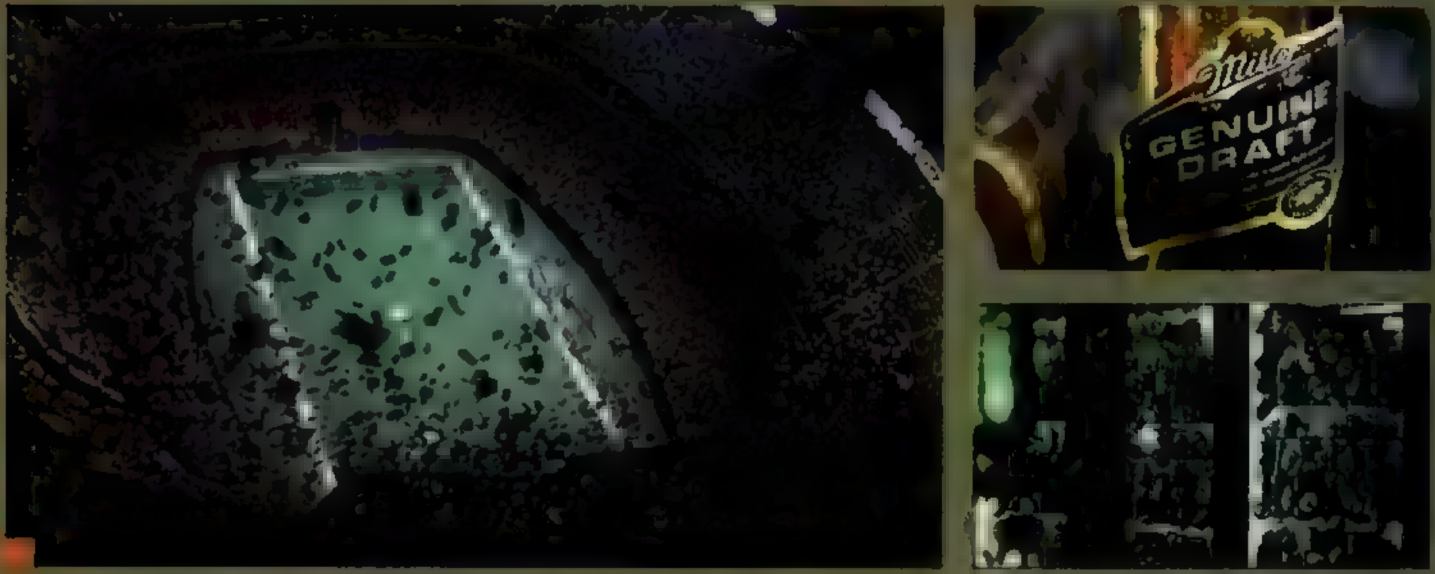
minivegas produced the promo for Bloc Party's track *Pioneers*, collaborating with Glassworks. "We needed a style that would give the 3D models character, and a simple form of animation due to time constraints," explains Luc Schurgers of minivegas. "We used the same rigs for all characters, so we could transfer animation. The style's a cross between Tintin and manga, but more vibrant. We married animation and toon shading in *Softimage|XSI* with artistic compositing and painting of backgrounds using *Combustion* and *Flame*."
www.minivegas.co.uk, www.glassworks.co.uk

05 MILLER GENUINE DRAUGHT AD

Time for a cool beer. And as you look up, you see thousands of beer labels, peeling themselves off their bottles, filling the streets and skies. Poetic. You're in a Miller ad, of course, created by Framestore CFC teams in NY, London and Paris. Head of 3D Commercials in London, Andy Boyd, dealt with the bird-like labels. "For the 'hero' label shots, which were close-up, hand animated shots, we used *Maya*. For the flocking shots, which involved up to 15,000 individual labels, we used *Houdini* – it gave us the ability to add a lot of complexity to the movement."
www.framestore-cfc.com






Miller
GENUINE
DRAFT

+ POLAR OPPOSITES -

3D artists and matte painters work in totally different ways, but do they appreciate each other's jobs? **Jonathan Privett** and **Charles Darby**, both of Rushes, try to see eye to eye

LIKE THE UNIVERSE ITSELF, you can only truly understand one small part of 3D - the part you are closest to. But while its vast scope intimidates newcomers and seasoned professionals alike, this is also part of its beauty. Since you can never comprehend it all (those who think that they can do so are either deluded or naive), there are always new alleyways to explore. The 3D universe is expanding, pushing ever outwards towards some unseen and indeterminate point, so no matter how fast you travel, the edge is a hard place to reach. The thrill is simply in getting close.

In comparison, matte painting is distinctly finite. Yes, it requires experience and skill, but there is nowhere really new to go. You are limited to a single dimension and to a world in stasis - how many of us have resorted to adding a flock of birds to a painting to bring it to life? Matte painting is simply a craft, while 3D is a science with a big chunk of craft thrown in, or vice versa, depending on your point of view.

The demands placed on a 3D operator's mind are significant. Thought and planning must go into everything, since each action will have a subsequent and potentially serious consequence. It is vital that you learn anticipation - and not only in the sense that an animator would use the term. 3D artists are engaged in a constant battle to predict the future, simply in order to anticipate what the client may do next. For example, if they ask you to create a character that smiles, do you also set it up to frown or pout? Guess correctly, and you will be saving yourself a lot of time later on. While a painter has the luxury of painting over any inadequate areas without going back to square one, in 3D it is all too easy to back yourself into a corner with just a few minor errors.

For instance, we recently completed the re-branding of a large US cable channel which involved a number of idents as part of the package. One particular part highlighted the speed with which a seemingly simple exercise can grow arms and legs. Initially, the shot required a texture to flow like a viscous liquid over the horizon towards the camera. However, one slight change in the brief required a big camera move to reveal that the liquid was flowing over a planetary sphere. This in turn meant a total rework.

3D IS EVER EXPANDING. MATTE PAINTING IS DISTINCTLY FINITE

JONATHAN PRIVETT, 3D ARTIST

The complexity of such changes is often totally lost on the client. Why can't you simply move the camera, they ask? They aren't to know that you'd suddenly need an enormous texture which has to resolve itself from fluid into something spherical [illegible] perfect sphere [illegible] explain this [illegible] process [illegible] painting, where a single stroke can fix everything.

[illegible] should [illegible] harsh [illegible]. After all, the joy of our industry is in combining media to create a beautiful end result, and sometimes that means we really do just need a great matte painting.

[illegible]

www.rushes.co.uk

Charles Darby, Digital Matte Painting Supervisor at Rushes, has worked at Digital Domain and is a passionate advocate of the versatility of matte painting in either 2D or 3D
www.rushes.co.uk

I'M A PAINTER. I'm a simple fellow. Even though I work in the film industry designing and creating visual effects, I try to keep a polite distance from the technical quagmire that surrounds 3D. The more complex the technical problems become, the further away you are from what you are creating, and that makes it harder and harder to hold on to your all important original artistic vision. I have worked on over 45 films so far, and with each one I have come to believe more and more strongly that a well designed, well-executed 2D matte painting augmented with 3D elements is the way to do things. To me, it reaffirms why I love what I do.

Although in the past, I have run firms that employed banks of CPUs to render tricky 3D matte paintings, I have always tried to create compositions that appear far more complex than they really are. This means that when working with directors, I can often find a simpler solution than jumping straight into *Maya*. Many times I have constructed shots almost entirely in 2D rather than have them cut due to budgetary concerns - and not at the expense of realism, either.

A few years ago I was asked if I could devise a hero shot for *Crouching Tiger, Hidden Dragon*. Ang Lee, the director, wanted a wide view of Beijing but described a camera move to reveal it that quite frankly the production could not afford. The camera move was also unnecessary given the context of the shot. In many budget breakdowns, the shot would simply have been cut, but I designed a clever view of the city that made it possible to pan down an oversized painting with three different perspectives. As the virtual camera moved, it gave the illusion that perspective was changing in a natural way, giving a very realistic, three-dimensional feel. This would have been ten times more expensive to do in 3D, though no better in quality.

In fact, realism and a sense of the organic are easier to attain in a good matte painting than in 3D. Whereas large groups of 3D operators slave over hot monitors trying to get the lighting in any natural state, I may be able to do one brush stroke and I'm done.

WHAT I DO CAN BE TEN TIMES MORE EXPENSIVE IN 3D, BUT NO BETTER

CHARLES DARBY, MATTE PAINTER

Unfortunately, not everyone appreciates what a really good matte artist can do. Having lived in California for ten years while I learned my craft, I returned to London to find far less understanding of matte painting. Many supervisors are simply unaware of just what can be achieved with a well-designed painting, and I hope that I will be part of a movement that will educate people working on European productions about this.

And, on a personal level, I love being able to work from almost anywhere on the planet without the need for large or terribly expensive equipment. It reminds me that I'm a painter... a painter who sees many great things about the world of 3D, but right now, is happy just where he is.

PLUGGED IN

NOTHING REAL

Entourage Arts has released four new collections of non-photorealistic content, including two vastly expanded existing packs of people and vegetation. The *Wang Wang* collections feature art from the eponymous Shanghai illustrator with a watercolour style, with other content created by Entourage Arts itself. Masking and separate pieces are supplied where necessary. Each pack costs $139.
www.entouragearts.com

PLUGGED IN

RENDERTASTIC

ART VPS has a [illegible] RenderDrive RD6400, a 64-bit version of its network system that can use 16, 36 or 48 of the proprietary AR350 ray-tracing processors. The company claims the RD6400 can address model sizes up to 30 million polygons at resolutions that exceed the capabilities of current displays, while supporting motion blur, radiosity, HDRI and more. The base version costs £6,950, $13,340 or €10,620.
www.artvps.com

WEBSITE OF THE MONTH

orange.bl[illegible]

The open source 3D app Blender is still going strong, and the ambitious Project Orange is set to take advantage of it. It's no less than an 'Open Movie' – a 3D animated short of 12-20 minutes to be created with Blender and other free tools such as Python. The finished film will also be published under an open source licence, as well as being shown in [illegible] and made available on DVD with no royalty obligations.

This is a joint production between the Netherlands Media Art Institute and the Blender Foundation, and though the core team is already in place, [illegible] many other positions are being sought. For practical purposes, some of these will need to be based in Amsterdam in the Netherlands, but online work is also a possibility. The website gives detailed information on all phases of the production, so if you're interested, now's the time to get involved.

Further sites...

www.hypegallery.com
Online version of the physical Hype Gallery: a multinational exhibit which encourages new artists to submit their work, in whatever medium. Everything submitted is displayed, and if you can't make it to one of the real spaces, just do it online.

[illegible]
Not the most striking of sites on your first visit – it is, indeed, little more than a forum – but Macforums prides itself on its community. A nexus for [illegible] *Mac* users, it's been running for five years now and boasts nearly 13,000 members.

BODIES FOR FREE

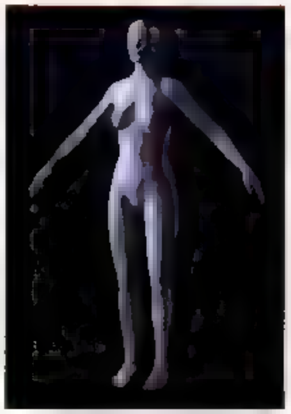
OPEN SOURCE Do what you will with these synthetic people

TIME WAS THAT a virtual arm and a leg would have cost you, well, an arm and a leg. But now virtual humans are available free courtesy of Zygote and Sixus1 Media.

The two new sets of models, both featuring a male and female figure, are provided as open source to be used in any way the artist likes. They're part of the existing Open3DProject, an ongoing effort to make high quality models royalty free and available for unlimited use or even further modification.

"We felt the time was right to offer high-quality 3D human models with open source licensing," said Bryan Brandenburg, CEO of Zygote. Although the model sets are fairly low-res, Zygote says there is sufficient resolution in key areas for high-quality renders without needlessly wasting time. Details such as nails, hair, teeth and tongue are also present, grouped to enable easy modification.

www.open3dproject.org
www.zygote.com
www.sixus1media.com



● The models might look fairly basic, but for free it's a not bad deal overall

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Rafael Braga
Motion Graphics & Character Generator Operator, Casablanca, Brazil

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Avid.
computer graphics

● **Spelunkers beware...** matching CG with background plates is tricky when your only light source happens to be attached to a terrified diver running for his life

The Cave

FILM Complex lighting in this forthcoming scare flick from Sony Pictures made Luma Pictures' job of creating CG monsters all the harder. A switch to an all-Mac pipeline was the answer – perhaps a film first

Next month sees the release of *The Cave*, a traditional frightfest of the man-versus-creature mould. Its plot concerns three divers who descend deep into the Romanian mountains, become cut off when an explosion blocks their exit, and eventually have to battle bizarre cave beasts.

The bulk of CG work for the film – around 250 shots – was provided by Luma Pictures, perhaps best known for its work on *Underworld*. As most of the film takes place underground, the numerous rocky interiors and dimly-lit scenes didn't always make things easy for the effects team.

In one shot, for example, a CG creature drags an actor through the water, with no lighting apart from the actor's head-lamp. "This led to very artificial-looking actor footage," explains Payam Shohadai, Visual Effects Supervisor. "He looked almost CG, due to the lighting and the fact that he was against the black of the dark water. Generally our task is to match the actor footage, which in this case would mean making our CG look like CG. It was a lengthy compositing process to get the shot to look real."

Matching lighting proved challenging throughout. In many shots, the greenscreen elements of the actors were lit very differently to the background plates, but realistically Luma could only match its CG creatures to one or the other. "Ultimately we made the decision to create and animate digital doubles for the actors, which were lit to match the background plate," says Shohadai. "We then used the lighting and occlusion from the digital double as comp elements to make the greenscreen actor element play well with the CG creatures and background plate."

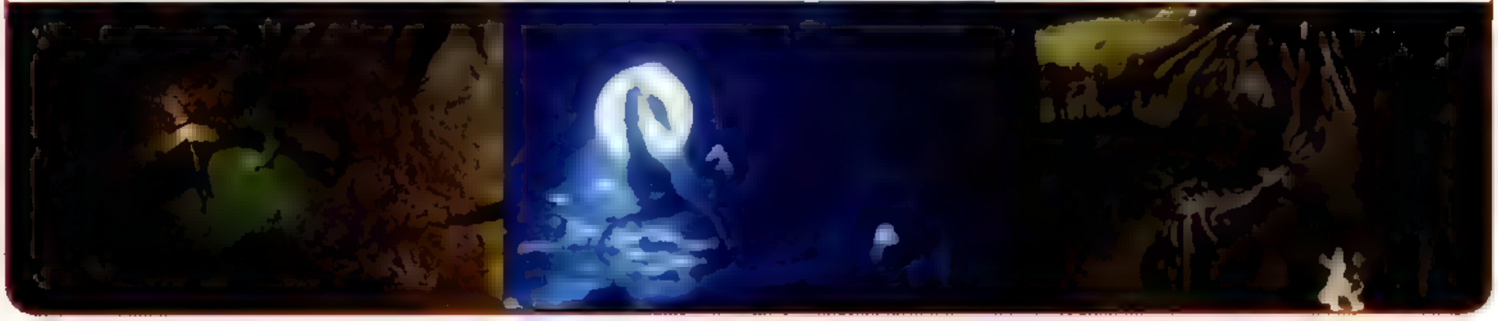
The Cave was Luma's first large-scale trial of an entirely new production pipeline – one based solely around Macs. Generally dissatisfied with Windows and disappointed with Linux's usability, the team were intrigued by Apple's purchase of *Shake* and its subsequent price drop.

After extensive research Luma took the plunge, opting for *Maya, Shake, Combustion, ZBrush, BodyPaint 3D, Final Cut Pro, boujou* and more, using G5 hardware and Xserve servers tied together with Xsan and 17 terabytes of storage.

The studio hasn't looked back. "I strongly endorse Macs now," says Shohadai. "It is a great daily experience using the platform, something that can only be understood after some time."

It is, he believes, a misconception that the software selection is limited. "I think many people just did not view it as a viable platform on which to do 'serious' visual effects. But you know, we are doing completely photoreal creature effects for feature films in which the creature interacts with the actors... these types of shots are about as serious as these things get."

www.luma-pictures.com



Letter from Hollywood

Once more with **feeling**

Craig Zerouni has something to say about celebrity voice acting in animated films – and it's certainly not "Here, have a whole heap more money, Mr Stallone"

One of the many things to like about *The Incredibles* is that, alone among CGI feature releases, it doesn't rely on A-list celebrity voice talent. Oh OK, I'll give you Samuel L. Jackson, but really, that's it, and his role is only a supporting one. Sure, people have heard of the actors playing the main characters (Craig T Nelson and Holly Hunter, to give them their due) but these are not names to rise above the title of any summer blockbuster. And Brad Bird, the director, steals the whole show with his own performance as Edna Mode, designer to the superhero gentry.

Because frankly it's getting tedious. The 'art' of casting a CG film is now almost completely given over to assembling as noticeable a list of names as possible - never mind if any of them belong in the film. Look! Look at all these famous people we lined up for this movie! The movie itself? Whatever.

What's especially exasperating about this is that many of these famous voices do real harm to these films. Some celebs are more famous for being themselves for anything else, and in an animation, that can be more distracting than entertaining.

Antz had this problem. I submit: Can Sly Stallone be anyone but himself? His voicing of a strong, noble and not too bright ant wasn't much more than hearing Stallone on the radio while looking at an ant. And Woody Allen... there seems to be almost no difference between Woody Allen the man and Woody Allen the shambling film character. He doesn't act - he just wanders around through life, and occasionally he wanders into the frame of a 35mm film camera. In *Antz*, every time his character spoke my mind left the ant hill and went straight to New York. It was impossible to actually follow the film after that.

Other comedians do better. Albert Brooks and Ellen DeGeneres managed to fill out their characters in *Finding Nemo* to an amazing extent. They were more than funny, they were somehow profound - not easy to do while clinging to the tongue of a whale. And sometimes this works in spite of itself; Robert DeNiro doing the voice of the head of the shark mafia is sort of amusing, in a pop culture will eat itself kind of way.

Part of the problem is that, while this may look like a new gravy train for big name stars, it's not as easy as it seems. The recording process is very alien to most actors, not only is there no audience, there are usually no other actors either. It's hard to have comic timing when it's just you and the director.

Many people find this difficult to adapt to, and some find themselves replaced when they can't get into the groove. It would be great if they could keep those and show them in the bloopers during the credits: "Here are several people you've heard of that we fired during the making of this film!"

Maybe this is because Hollywood hardly ever produces actors any more. Mostly we get celebrities, people who look nice and who can play themselves fairly well. But then consider Jason Lee, the voice of Syndrome in *The Incredibles*. While you might recognise his face, he's not a big name, yet he's been in 30 feature films since 1991. Now that's worth shouting about.

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Senior Lecturer MA 3D Computer Animation, Bournemouth University

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Avid. computer graphics

EVENT HORIZON

LONDON ANIMATION

RUSHES SOHO SHORTS
30 JULY 5 AUG, LONDON, UK
The seventh time around, Rushes' celebratory festival hits the regions, travelling to Birmingham, Edinburgh, Cambridge and Islington, together with the usual Leicester Square screenings
www.sohoshorts.com

SIGGRAPH 2005
31 JULY-4 AUG, LA, USA
Show guides at the ready because it's almost that time again. Everyone who's anyone will be there (except Mental Roy) and you can expect the usual slew of big announcements and relentless networking
www.siggraph.org/s2005

SMART GRAPHICS
22-24 AUG, MUNICH, GERMANY
The 5th International Symposium on Smart Graphics examines research in visualisation, design, cognitive psychology and AI, with regard to computer-generated graphics. Very much an academically focused event
www.smartgraphics.org

LONDON INTERNATIONAL ANIMATION FESTIVAL
23-28 AUG, LONDON, UK
Short films from all around the world, kids' animation, the latest UK films in a special British panorama, student animation and computer animation
www.liaf.org.uk

Annecy Festival

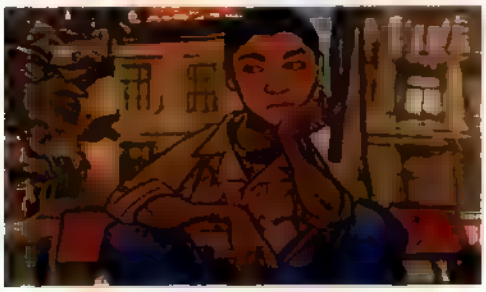
SHOW REPORT This year's seminal animation festival showcased everything from a madcap Hungarian version of Romeo and Juliet to gothic Australian adventures and German jokes...

France's annual Annecy Festival is one of the largest events dedicated to all forms of animation. It features an international competition, conferences, a film market (the MIFA), various programs and presentations, and even networking opportunities for students and professionals such as the Creative Focus and the Job Fair.

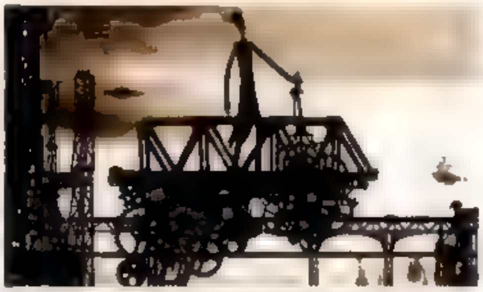
This 29th edition was dedicated to Canada, one of the most prominent countries in animation. During the festival, 485 films were screened, with 173 making up the competition. And in these PC times, it was refreshing to see a retrospective of politically incorrect films.

First prize for short films went to *The Mysterious Geographic Explorations of Jasper Morello*, by Australian Anthony Lucas – a beautiful gothic mystery with a strong visual style reminiscent of German expressionism and Jules Verne's stories, along with a touch of *Lemony Snicket*.

Hungarian film *Nyócker! (The District!)*, by Aron Gauder won first prize for feature films. This totally berserk hip-hop version of *Romeo and Juliet* combines 2D and 3D animation with cut out characters. While the movie sometimes loses itself in its own craziness, its ruthless humour and demented ambience feels good and radically contrasts with the predictable style of many animated features.



● *The District!* by Aron Gauder is a totally insane take on Romeo and Juliet, mixing 2D and 3D animation to great effect



● *The Mysterious Geographic Explorations of Jasper Morello*, by Anthony Lucas, is an intriguing gothic horror mystery

Stephan Flint Müller's short film/happening *Fliegenpflicht Für Quadrat Köpfe (Bowtie Duty for Squareheads)* drew many comments. Roaming the streets of Berlin, Muller used anything which he could point his camera at to create visual jokes. He animated billboards, made fun of street signs and brand logos, and more.

Though the film is wickedly funny and received both the Jury's Special Mention and the Audience Award, some wondered if, with only a few seconds of actual animation, it should have been selected in the first place. But as the Festival's Artistic Director, Serge Bromberg, commented: "Nowadays, animation lies more in a state of mind than in the techniques used."

www.annecy.org

Production line

The month's other releases in brief

SWIFT 3D 4.5

The popular 3D animation software gets another update, featuring video export capabilities to AVI, *QuickTime* and FLV formats. There's also a heap of vector rendering enhancements, render speeds up to 50 times faster, support for level 3 EPS and more. $229

[illegible]

CARRARA 3D BASICS 2

An entry-level version of *Carrara*, aimed at the beginner market, *3D Basics* offers straightforward scene wizards, an improved interface and enhanced nature modelling tools, such as a terrain editor. It's yours for £83 / $99 / €118.

[illegible]

GENETICA 2

Described as a 'seamless texture editor', *Genetica 2*'s new features include the Lab - an easy way of creating textures from scratch. The Weather Lab, for instance, applies a variety of ageing and weathering effects. Standard version is $129, with Pro at $399.

www.spiralgraphics.biz

BOXX 7400 WORKSTATIONS

A new line from the acclaimed 3D workstation people, featuring Dual-Core AMD Opteron processors. BOXX claims this offers up to 50 per cent faster rendering performance than single-core systems. Prices start from $5,044.

www.boxxtech.com

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- Integrated Broadcom 10/100/1000 LAN with PCI-EXPRESS interface
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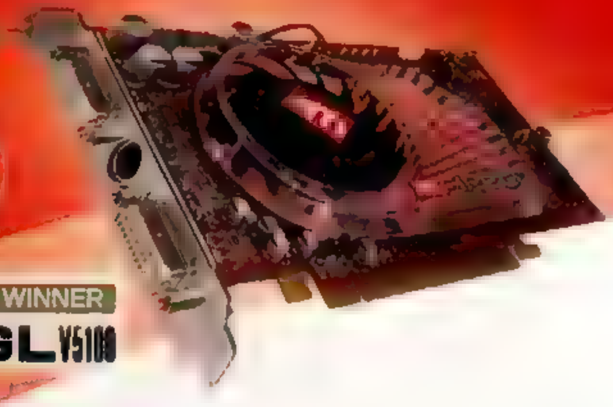

3D WORLD

THIS ISSUE'S WINNER

FireGL V5100

Some selected partners [illegible]

Best mid-range price/performance graphics card for 3D modelling

The HP xw4200 workstation delivers a powerful combination of industry leading technologies that deliver world-class workstation performance for an amazingly low price. It features the Intel® Pentium® 4 processor with Extended Memory 64 Technology and Windows® x64 support. The award-winning FireGL V5100 PCI-Express workstation graphics card from ATI delivers the power to handle the most detailed models and datasets. Options such as SCSI drives and RAID controllers ensure that you can configure the system to meet your needs. HP has formed strong alliances with all key software vendors to provide you with a fully optimised and supported platform.

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Air Jordan XX web spots

For its latest Nike project, Tronic Studio was tasked with bringing a new pair of Air Jordans to life. And with the emphasis on the footwear, who needs a basketball player? [illegible]

Tronic is a design and animation studio with a difference, its unique selling point stemming from the unusual background of founders Jessi Seppi and Vivian Rosenthal. Rather than entering the industry through the familiar art and animation routes, they began working together while studying at Columbia University School Of Architecture.

Embracing the faster turnaround of non-architectural projects, the duo were soon balancing installation art with commissions from clients such as MTV and Fuse. Then came two key collaborations with Nike.

"We were initially doing shoe modelling for the NikeLab website," says Seppi. "Our architectural background gave us the grounding to get inside the shoes, break them apart, and show the various components."

This latest project for the prestigious sports brand focuses on the new Air Jordan XX shoe, but rather than push the product via broadcast it's instead being used as an online advertising tool. The website construction was handled by Blast Radius in Canada, with Tronic commissioned to produce a variety of full shoe and 'breakdown' stills, along with CG animations that show the AJXX in action.

"We wanted to do something a little different to what we'd delivered for the NikeLab site, and so approached Nike about using its motion capture facility to obtain data for some basketball moves," says Seppi. "They've typically used the mo-cap data for videogames so far, but they're very interested in finding other uses for it, particularly applying it to ad spots."

Keyframing, says Seppi, would have produced overly smooth results. "With mo-cap we'd be able to replicate all the subtle nuances of the real motion. But we wanted to focus on the footwear rather than the player, so we came up with the idea of using it produce a more abstract animation, cutting the player right out and presenting only the motion of the shoes."

Nike also supplied Tronic with a pair of the AJXX shoes for reference when building the CG version. This involved taking the shoes apart, measuring and modelling every component, and then putting these together in *3ds Max*. "The shoe for the animation was created at lower resolution than those we usually do. Our standard models for web and print are super-dense, and aren't stitched together in such a way that the necessary deformations would work properly. Our shoes usually comprise around half a million faces on average, with subdivision polygons also applied. These contain about a quarter the number of polygons."

WALK THIS WAY

Further detail was added with extensive use of normal mapping. Then, with Nike's motion-capture data fed through *MotionBuilder*, it was matched to *Character Studio*'s standard biped rig. Rather than just focusing on the shoe detail, the whole body was animated using the data.

"It would actually have been more work to strip the extra data out," says Seppi. "Having it there also helps with the camera setup, and being able to view the whole body animation makes it easier to understand the foot movements. Even if we'd used keyframing I think we'd have still done the whole guy, and only then removed everything but the shoes. Just trying to animate the feet in isolation would be pretty much impossible."

Deciding on the best way to handle camerawork proved difficult. Eventually it was decided to chain the viewpoint to the invisible athlete, adding a suitably edgy hand-held sort of look. "The problem was that it wouldn't work for some movements. So we had to work through the whole animation, fine-tuning the composition for each frame to make sure the shoes were shown well."

Although destined for the web, the final results were rendered using *Brazil r/s* at high resolution and then rescaled as appropriate. "We didn't really approach the job any differently to a normal broadcast job," says Seppi. "Because all the necessary product information is on the website itself, we could create a purer, more abstract kind of animation. Once Nike trust you then they're very good about giving lots of creative room to move."

www.nike.com/jumpman23/jordanxx/ajxx_home.jsp

DETAILS

TITLE
Nike Air Jordan XX

PRODUCTION COMPANY
Nike

DIRECTORS
[illegible]

RUNNING TIME
[illegible] seconds

FIRST BROADCAST
May 2005

WEBSITE
www.[illegible]

TEAM SIZE
[illegible]

TIME TAKEN
Three weeks

SOFTWARE USED
3ds Max
MotionBuilder

Nike website visitors who select the 'Watch them play' option in the XX shoes section can view three different looping animations. Only the shoes are visible – it's their movement, coupled with the squeaking noises of rubber on the court and the bounce of an invisible ball, that really conveys the sense that a game of basketball is being played. The first sequence shows a dunk, the shoes jumping spectacularly into the air and the camera moving wildly to keep track of the action. The second shows a jump shot, this time giving a view of the action from behind. Finally there's the defensive shuffle, showing sidestepping and other fancy footwork up close and personal.

[illegible] | How Tronic Studio made Nike's Air Jordan XX trainers strut their stuff on the web

01 Tronic's models, created in *3ds Max* by hand. "We have considered using a 3D scanner, but haven't got round to trying it," says Jesse Seppi. "Instead we basically took the shoe apart and really got inside it. We even opened up the sole."

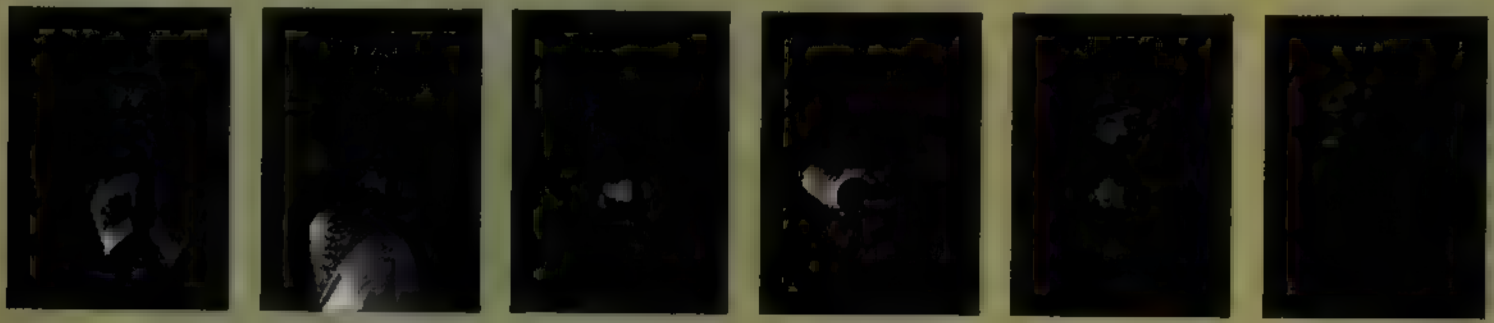
02 Motion capture data supplied by Nike was taken into *MotionBuilder* to be cleaned up and saved as a *3ds Max* friendly file. "We're pretty much novices at cleaning up work. Usually what we receive is ready and prepped for *Character Studio*."

03 The cleaned-up motion capture data was used to drive a full body rig. "One of the great things about *Character Studio* is that it has a biped skeleton already fully connected. That was a real time saver. We just scaled it to match."

04 *3ds Max*'s Physique modifier was applied to drive the animation, with the AJXX models responding when the basketball player runs, turns or shoots. "It was mostly used around the ankle, with some further deformation at the toes."

05 A highly reflective [illegible] give the otherwise abstract-looking shoe movements a firm grounding. The texture map used here mirrored the pattern featured on the lace covers of the AJXX.

06 "*3ds Max* was the staple here, with *Brazil r/s* used for rendering," says Seppi. "Obviously *mental ray* is now available, but we've been using *Brazil* since its very first iteration and we're now really well versed in it."



The Empire Moves In

FACILITY Lucasfilm and Industrial Light & Magic open their new, futuristic office in San Francisco, which includes the entertainment world's largest computer network, a day-care centre, a full gymnasium and a 17-acre park. But will there be enough space for George to store his wads of cash?

Claiming to have created the "world's first digital arts centre", George Lucas, the father of digital cinema and chairman of Lucasfilm Ltd, has begun moving several divisions of his empire into a state-of-the-art facility in a national park near the foot of the Golden Gate Bridge in San Francisco.

"Eventually, the rest of the world will catch up with us, but for now, this is where it is," said Lucas at the swish party he threw in late June for 2,000 friends and neighbours to celebrate the project's completion. "It's the Bay Area's digital arts centre and it's the only one. There are none in LA."

The new facility, the Letterman Digital Arts Center occupies six acres of a 23-acre site that was once a hospital on the former Presidio military base. The remaining 17 acres have been transformed into a public park, featuring grassy hillocks, a creek and a Yoda fountain.

Nestled within is the entertainment industry's largest computer network, designed to accommodate 4K images via 300 10GB and 1,500 1GB ports. High-speed fibre optics link the LDAC to the Skywalker Ranch, where Skywalker Sound, a research library, and the new animation division will stay with Lucas.

LucasArts, the game division, moves first, followed by Lucas' corporate licensing, marketing and online divisions. Industrial Light & Magic's staff will move as projects permit during the summer.

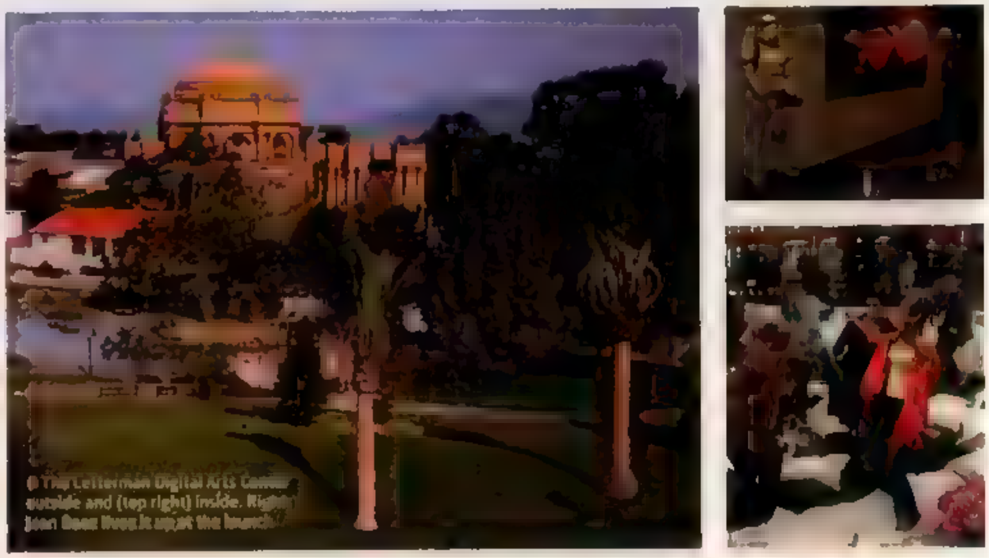
At the Center, LucasArts and ILM will share the same pipeline. ILM's R&D department has been working on bi-directional collaborative tools for games development and visual effects users for the past 18 months. With the new pipeline (dubbed Zeno), assets created with the sculpting tools used by ILM can, for example, be dropped into Zed, LucasArts' game engine, and assets edited in Zed can be updated by other software in Zeno. According to Cliff Plumer, Chief Technical Officer, the goal is to enable multiple users to collaborate in real time.

Because the pipeline offers a consistent user interface, asset management and revision control, all of the tools in the pipeline are available to everyone. This means that technical directors can paint, painters can model, and modellers can light, while 600 miles of cable move high-res images through the four-building campus at an impressive speed. Raised floors enable workspaces to be reconfigured with each new project.

"The move opened the opportunity to re-invent the pipeline," says ILM's eight-time Oscar winner, Dennis Muren, who designed interface standards for Zeno between stints as VFX supervisor on *Hulk* and *War of the Worlds*. "It's been frustrating to be told to do one job, but that's the only way you can turn out 4,000 shots a year. With the *Star Wars* movies ending, we're going to get down to a more realistic number of shots. So we've given the artists the opportunity to do practically anything if they want to."

During the celebration, which included a lavish picnic with live music organised by Boz Scaggs, singer Joan Baez perhaps put it best when she sang: "There's something to be said for having a billion bucks."

www.lucasfilm.com/inside/letterman


The Letterman Digital Arts Center outside and (top right) inside. Right: Joan Baez lives it up at the launch

> **"EVENTUALLY, THE REST OF THE WORLD WILL CATCH UP WITH US, BUT FOR NOW, THIS IS IT"**
> **GEORGE LUCAS, CHAIRMAN, LUCASFILM**

The numbers game | What an estimated $350 million gets you

Fancy trying to compete with the new home of LucasArts and ILM? Then beat these stats...

Only three screens? Not much of a multiplex...

YEARS TO COMPLETE	4
BUILDING SPACE	865,000ft²
NUMBER OF BUILDINGS	4 (one will be rented out)
NETWORK	300 10GB ports, 1,500 1GB ports
CABLE	600 miles
DATA STORAGE	100 terabytes
DATA CENTRE	13,500ft² centre houses render farm, servers and storage systems
PROCESSORS/RENDER FARM	3,000 AMD processors, rising to 5,000 after standard office hours
CINEMAS	Three (one 300-seat cinema with 49x21 foot screen, two 65-seat cinemas for dailies, both for digital and film projection)
PARKING	1,500 underground spaces

"Put washing-up liquid in the fountain, you will not." Yoda might well be a Jedi master but he's municipally minded too

Odd jobs for new artists

SHOW REPORT Stop animating and start camera tracking if you want to find work, advise speakers at Glamfest 2005

Pressures within the 3D industry now mean that animation graduates have to switch jobs two or three times before ending up in the career of their choice, according to speakers at Glamfest 2005, Glamorgan College of Art and Design's annual graduate careers fair.

"These days, you have to work up to being an animator," commented Bruce Steele, Head of Special Projects at Glassworks. "The software costs the same whether we hire you or the guy who did Gollum."

With studios recruiting in an estimated 10-12 separate job categories for each major project, students were advised to [illegible] get less popular job roles, with speakers citing concept art and match moving as possible routes into the industry.

"Find something that's not as attractive as what you actually want to do, become really good at it and work your way in that way," said Frank Kitson of Electronic Arts. "Camera tracking is a good one, although it's probably the most boring job on earth."

While expertise is regarded as a prerequisite for careers such as modelling or character animation, less mainstream job roles place a premium on commitment. "I'd rather work with someone reasonably talented who just gets on with the job than a genius with a bad attitude," added Kitson.

Some studios even go so far as to bring in potential employees on work experience placements simply to check their ability to work in a team. "It's a small industry, and even at graduate level we get to know who's good," said [illegible] Brunsdon, Broadcast and Development Manager at Aardman Animations. "Do a bad deed, and your sins will find you out."

But for animation graduates despairing of ever finding employment in a career of their choice, there is light at the end of the tunnel. Jane Davies, Head of Animation at Bristol's a-Productions had a simpler formula for success: "Work hard, learn the process, don't be a twat and you'll be fine."

Further details of this year's show can be found at the URL below. For more on unusual careers in 3D, see page 61.

www.glamfest.net

Glassworks' Bruce Steele advises students to be realistic when applying for jobs at Glamfest 2005: "The software costs the same whether we hire the guy who did Gollum or we hire you."

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3DWorld Magazine #66

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BLAH

MeNTaL RoY

It's summertime, and the living is easy. Well it is if you happen to be **Mental Roy**, who's foregoing the 'pleasure' of visiting any actual trade shows this year to selflessly bring you that SIGGRAPH experience in full

I CAN SAVE YOU THE PHYSICAL, FINANCIAL AND QUITE POSSIBLY EMOTIONAL TRAUMA INHERENT IN A SIGGRAPH TRIP

IF YOU'VE BEEN to one industry trade show, you've been to them all (and if you *have* actually been to them all, I pity you). Unfortunately it's that time of the year when the sun inconveniently intrudes into even the deepest darkest cubicle, and coaxes out even the most whey-faced, monitor-tanned 3D drone into the real world, visions of exciting new plug-ins and thrilling new cocktails dancing in their sleep-deprived brains.

SIGGRAPH, then. It's undoubtedly the most influential, the most comprehensive, the most potentially expensive show you can attend all year – which is precisely why I'm not going. Nope, I simply can't face hour upon hour being cooped in an air-reconditioned, ceaselessly cacophonic environment with godawful food and a bunch of people endlessly watching films. And that's just the plane trip.

But the mere detail of my non-attendance doesn't preclude me from presenting my SIGGRAPH 2005 show report, or at least edited highlights. By conveniently scheduling this before the show actually takes place, I can save you the physical, financial and quite possibly emotional trauma inherent in such a trip. No need to thank me.

Monday: Arrive LAX. Ah, beautiful LA – I'd forgotten the joys of its serene grace, its stunning architecture, its storied history... turns out I was thinking of Venice. LA apparently still consists of eight thousand miles of highway all going nowhere in particular, with a shite-smeared swathe of burger bars, crack dens and South Central wedged somewhere in the middle. Plus you can't smoke, in case you upset the delicate chemical balance of the smog.

Monday night: hotel, a $40 cab ride later. Studiously avoid the gaze of anyone who looks vaguely corporate. Head for bar.

Tuesday: new versions of every 3D software package in the world are being released, and I find myself staring, glassy-eyed, at another presentation being shouted by a sweaty kid who should surely be at school. The press release says this particular plug-in "utilises the synergy between dynamic workflow and the communication requirements of professionals to maximize productivity and leverage streamlining." I ask the boy to explain. He says it means you can now save in TIFF format. Ah.

Wednesday night: party – DreamWorks? Digital Dimension? ILM? Can't remember now. Doesn't really matter – the vodka and tonics come in half-and-half ratio. Spend 45 minutes being talked at by a bloke with a beard who tells me about NURBS. I steal his drinks vouchers.

Thursday: a conference at 8.30am... are they *mad*? It's hard enough getting to the one at 11. Lots of slides. Glance round room to spot other furtively hungover attendees pretending to scribble notes. There's that PR girl who was singing *I Will Survive* last night.

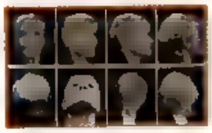
Thursday evening: user group meeting for a new version of a software app. Each time the speaker clicks on a new menu, the whole crowd whoops and cheers madly. The mention of Linux support has them on their feet, shaking with ecstasy. I quietly slip out the back entrance before they start setting fire to things or prepare a ritual sacrifice.

Friday: stagger onto plane under several hundredweight of press releases, dozens of T-shirts and assorted weird plastic tat covered in logos. Frankly the prospect of watching a *Mr Bean* episode 17 times has never seemed so welcoming. Same time next year then, eh?

PLUGGED IN

Facial Expressions is a new photo reference guide created by Mark Simon of A&S Animation. It includes photos of more than 50 models displaying a huge range of facial expressions, taken from numerous angles. The models range from 20 to 83 years old: "Most books use just one or two young, fit, white models," says Simon. "I photographed all ages, races and size."

www.marksimonbooks.com



GLOBAL ILLUMINATION

Key stats and trends from the 3D industry in specific countries. This issue: Japan

Japan's animation-related market is estimated to be worth 1 trillion yen, including the production of animated TV shows/movies, sales of video titles, and sales of merchandise featuring animation characters. The Japanese anime market is composed of animated films for cinemas, cartoons for television, videocassettes and DVDs, and branded character goods.

Pokemon was anime's first major commercial success outside Japan and the *Pokemon* TV series is now broadcast in more than 60 countries. Nevertheless, the first feature-length 3D animation made in Japan didn't appear until 1999. Called *A.Li.Ce*, it was a far cry from the technical sophistication of the following year's *Final Fantasy: The Spirits Within*.

Leading Japanese animation production companies include Studio Ghibli, GDH K.K., Toei Animation, Nippon Animation, and Production I.G. Driven by high labour costs in Japan, many of these corporations have been outsourcing anime production to other countries such as China, Taiwan, Philippines and South Korea. Key work such as planning and direction is done in Japan and routine operations such as animating and colouring are often outsourced.

[illegible]
www.digital-vector.com [illegible]

- More than 250 animation programmes per week are aired on television
- About 60 per cent of all TV animations viewed around the world are made in Japan
- About 23 per cent of the total printed material in Japan is comics and about 2200 animated television programmes are produced every year
- There are more than 440 animation production companies in Japan, 65 per cent of which are based in Tokyo

How long do you think it takes to get this good? Think again.
ESC 4PE
Escape Studios

urban gothic

Batman Begins sees the Dark Knight return for his most mature cinema outing to date. We talk to Double Negative's Paul Franklin about the R&D that enabled the studio to create its suitably sombre backdrop, a photorealistic Gotham City some 50 miles and many thousands of buildings across

BY MARK RAMSHAW

● Wayne Tower: the heart of *Batman Begins'* digital universe. At half a million buildings, Gotham is almost certainly the world's largest photorealistic virtual city

Batman may have faced many foes since his debut in the May 1939 edition of *Detective Comics*, but the greatest recent threat to his existence is arguably the way he has been portrayed on screen. After Joel Schumacher's critically derided 1997 movie, *Batman & Robin*, few expected to see the caped crusader stalk the streets of Gotham ever again. Enter Christopher Nolan, a director with a mere three films under his belt, but with the vision to create a new kind of Batman movie – one that not only redefines the franchise, but also marks a high watermark for the revitalised superhero movie genre.

Batman Begins remains faithful to the comic book mythology that inspired the previous movies, but in almost every other respect, it retools the crime-fighter's adventures from the ground up. From the presence of heavyweight actors such as Michael Caine and Gary Oldman in support, through to the brooding performance of Christian Bale (who allegedly piled on 80lbs in just six weeks for the role), this is a more sombre approach to the story of Batman's origins. It's an approach that also demands a sober kind of Gotham City: one in which the hero's exploits can err more on the side of believability than theatricality.

Bringing this vision to life required some 600 effects, 450 of them 'true' effects shots. Moving Picture Company handled all the digital bat work, BUF took on several hallucination sequences, and both The Senate Visual Effects and Rising Sun Pictures handled several scenes. But the bulk of the work – about 300 shots (including all digital work for Gotham City itself) – went to Double Negative. "We came on board very early in the preproduction

● Poised in front of the Gotham sunset, Batman broods on his latest cinema outing. To match the film's sombre mood, effects house Double Negative created a gritty, photorealistic urban backdrop

> "The photography for the HDRI photogrammetry took a really long time. We estimate that we shot 1.5 million exposures."
> PAUL FRANKLIN, VFX SUPERVISOR, DOUBLE NEGATIVE

FACTFILE

PROJECT
Batman Begins

WEBSITE
www.batmanbegins.com

ESTIMATED BUDGET
$[illegible] million

LEAD STUDIO
Double Negative

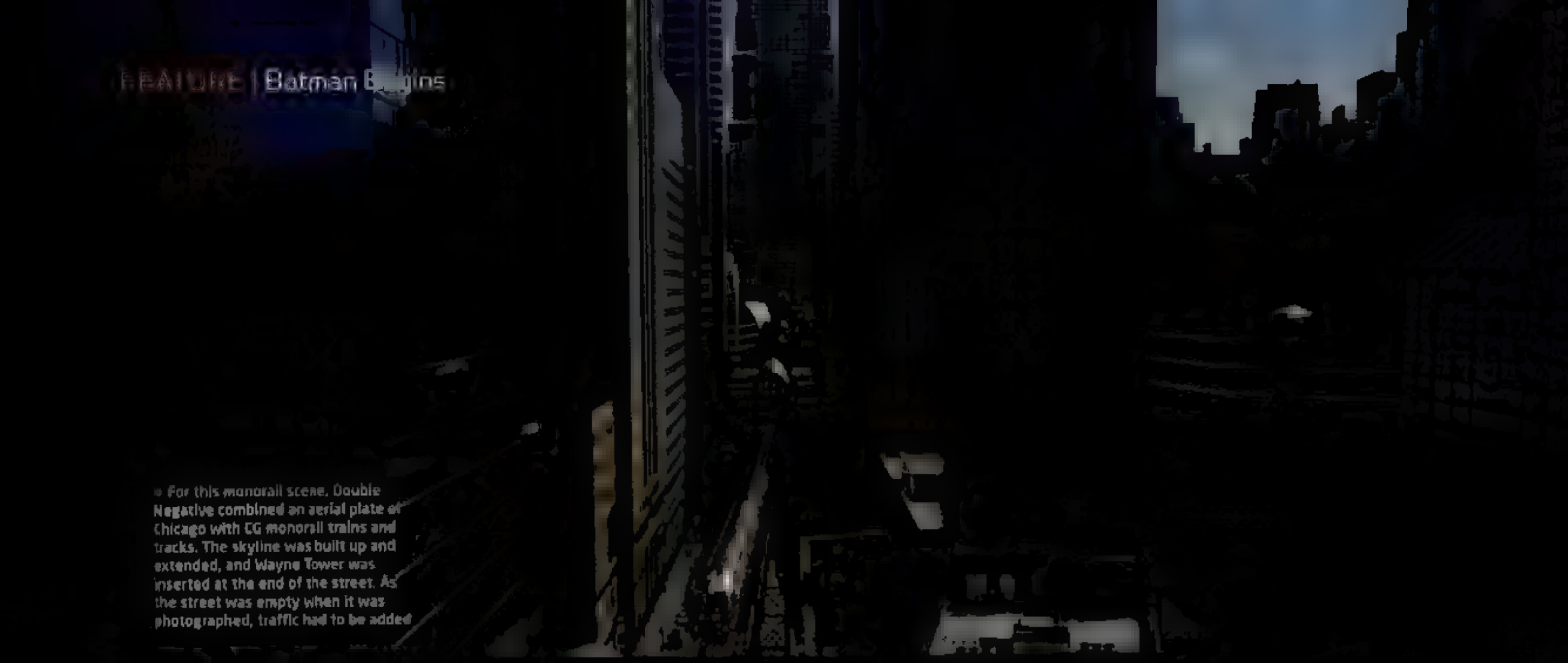
PROJECT DURATION
[illegible] months

[redacted]
[illegible] maximum

SO[redacted]
Maya, [illegible] Combustion, Shake

SELECTED CREDITS
[illegible] 2005, AVP: Alien vs Predator, Harry Potter and the Prisoner of Azkaban 2004

OTHER EFFECTS BY
[illegible] Moving Picture Company, Rising Sun Pictures, The Senate Visual Effects



For this monorail scene, Double Negative combined an aerial plate of Chicago with CG monorail trains and tracks. The skyline was built up and extended, and Wayne Tower was inserted at the end of the street. As the street was empty when it was photographed, traffic had to be added

process and started work around November 2003," says Paul Franklin, Visual Effects Supervisor at the studio. "We got a call from overall Co-visual Effects Supervisor Janek Sirrs, who we'd worked with on *The League of Extraordinary Gentlemen* and who knew we had a strong R&D department. We're very much into the idea of building a workflow to fit the project rather than the other way around, and he felt that this was a necessary approach to take with *Batman Begins*, not least because it was the first time that Chris Nolan had relied on digital effects."

Franklin reveals that the director chose to focus on the script during preproduction, rather than spend time storyboarding or doing pre-visualisation: "[Chris Nolan] often waits until he gets on set before he decides how he'll shoot something. He took that same approach with the visual effects process, which meant he wasn't in a position to define exactly what he needed and then ask us to do it. We obviously had to respond to that."

Nolan was also wary of relying heavily on visual effects. Wishing to avoid anything cartoonish, he pushed Double Negative to come up with a photo-based way of working. Every single scene would have to appear grounded in reality, even when they were pushing the laws of physics.

With a relatively luxurious six months available for a massive R&D push, Franklin and four other Double Negative staff set up camp at Shepperton Studios. There, they had the opportunity to see how physical effects work and to find out how Director of Photography Wally Pfister intended to light and shoot the movie.

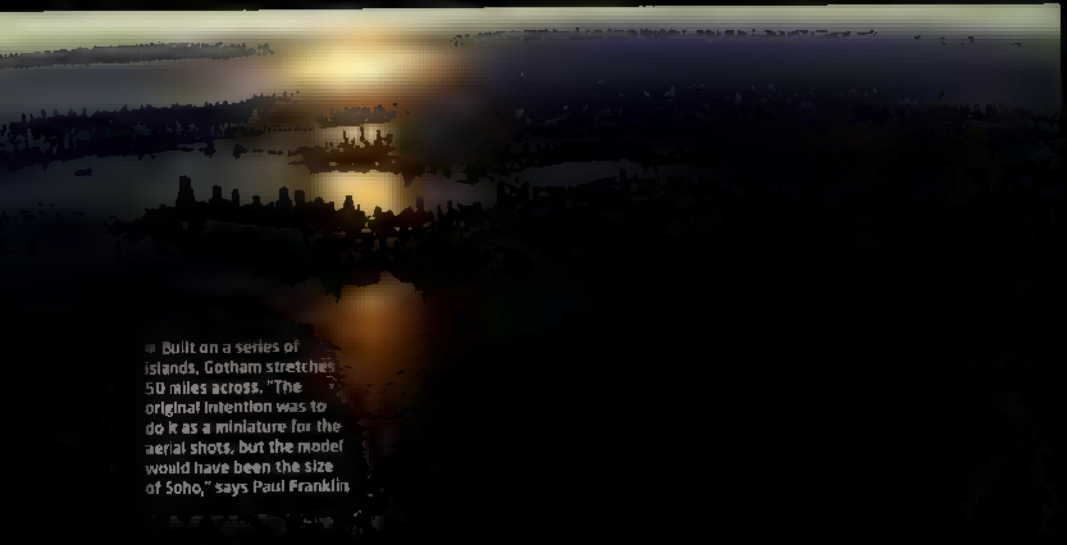
"While a lot of movies now rely on Digital Intermediate, *Batman Begins* was going to be a traditional lab job, so we spent a lot of time making sure our colour pipeline matched their stock," says Franklin. "Nolan and Pfister also chose to shoot with vintage anamorphic lenses. They're from the 1950s and give everything a very cinematographic look, producing incredible distortion patterns and chromatic aberrations when the light shines into them. We actually developed a bunch of scientific methods to analyse that, so we could write plug-ins to recreate the effects in compositing."

Double Negative planned on using digital camera stills for texture generation, with shots taken across a multiple bracketed f-stop range, and condensed down to get HDR images of a similar quality to that of the film stock. To help deal with this, a new colour pipeline was developed.

"You'll usually find that 3D guys work in 8-bit colour space, then the compositors work in something comparable to the final film. Instead, we used the Open EXR HDR format, creating a system so that the artists worked with the same colour space definition. It meant they could get the lighting exactly right at the 3D stage, rather than leaving things to be fixed in grading. It fits in with our philosophy of getting things right at every stage in the pipeline. We'll break scenes down into normal passes, reflection passes and dirt passes if necessary. But we try to keep that to a minimum, getting the balance right at an earlier stage instead."

While some live footage was completed in Chicago, the bulk of the sets for the movie were built at Shepperton and in a massive Zeppelin hangar at Cardington Studios. Everything beyond needed to be extended digitally. Nolan was worried that the extensions wouldn't mesh seamlessly, so the Double

"In the scenes of Gotham, you're presented with a glittering city wall, a fully rendered interior inside every single window."
PAUL FRANKLIN, VFX SUPERVISOR, DOUBLE NEGATIVE

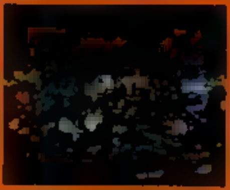


Built on a series of islands, Gotham stretches 50 miles across. "The original intention was to do it as a miniature for the aerial shots, but the model would have been the size of Soho," says Paul Franklin

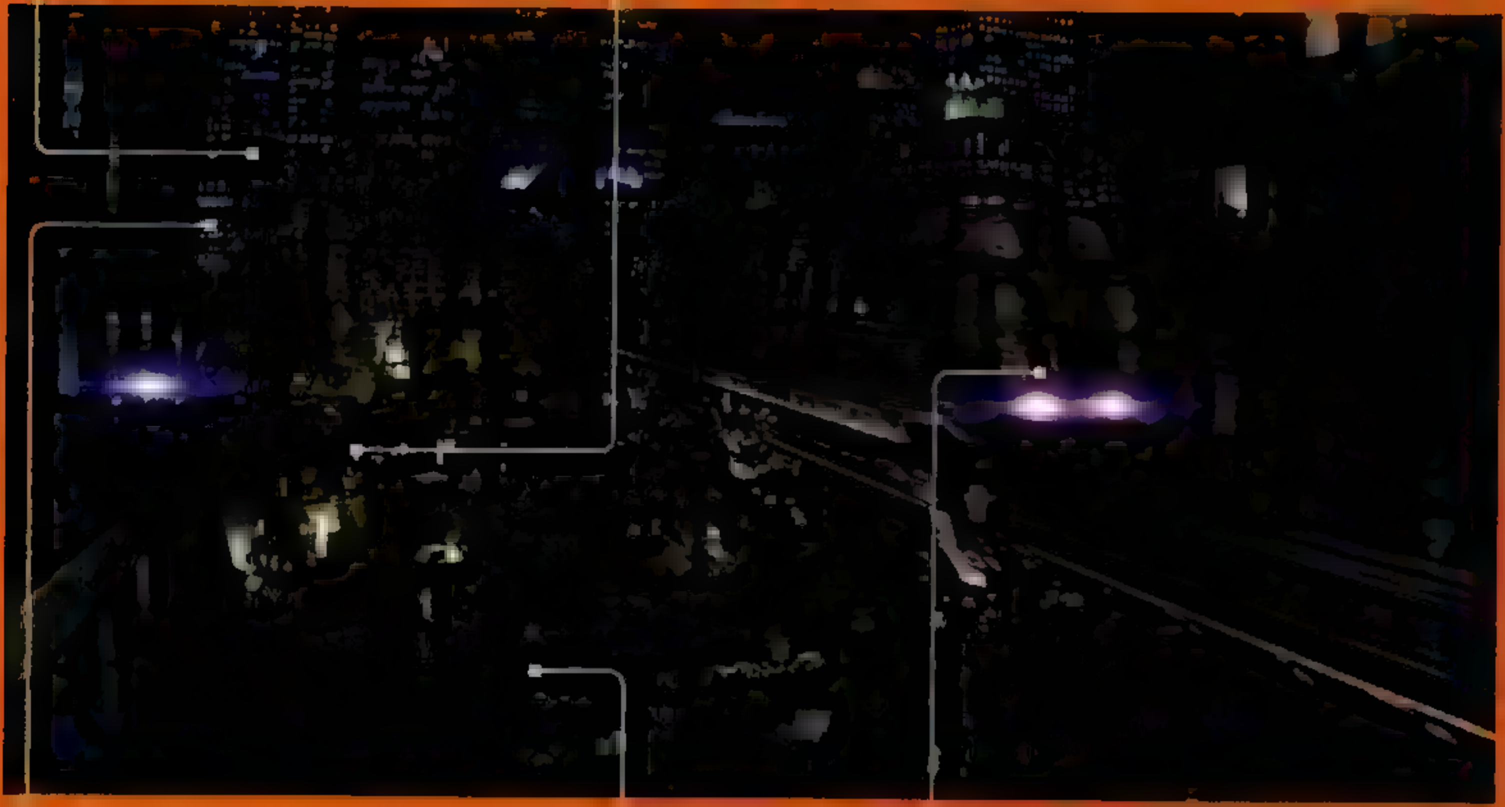
IN FOCUS | How Double Negative created a new vision of Gotham in Batman Begins

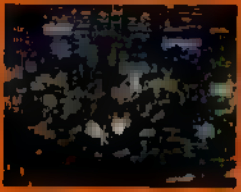
01 The raw ungraded plate of the Narrows Island miniature. Created at 1/12 scale, it measures 40x8ft and features wire, piping and lighting detail. Multiple passes of beauty lighting and practical lights are shot at this stage.

02 The miniature layer is gradually built up with digital layers. Additional detail is added to the windows through the use of Double Negative's proprietary *Plane-It* tool, which allows items to be composited in 3D space.



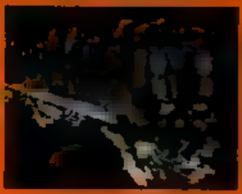
03 The combined passes are then composited with a CG river, lit with Double Negative's new HDRI lighting card process. Additional CG light sources and reflections are added to the miniature to increase the perceived sense of scale.





04 A CG-generated background cityscape is then added. Each building is an accurate recreation of an original building in Chicago, created using custom photogrammetry tools created by Double Negative's R&D team.

05 The foreground architecture is created in the same way as the background cityscape. All of the windows have detailed distortion and reflection passes, with detailed interiors derived from actual office spaces.



06 Finally, the train is added. The surface shaders feature specialist anisotropy routines, detailed displacement maps and surface textures. A detailed 3D interior, complete with flickering lights, is rendered separately.

Gotham's monorail speeds by, with Narrows Island visible down below. A lawless slum in the middle of the Gotham River, it has a chaotic feel at odds with the ordered layout elsewhere. The monorail is suspended several hundred feet in the air atop pylons inspired by the Sydney Opera House.

The design of the train was partly inspired by classic 1950s Amtrak trains "and also by Chicago's own El system," says Paul Franklin, Visual Effects Supervisor at Double Negative. "We got access to the Chicago train yards, taking photographs to see how the carriages reflect the sunlight, and also finding out details about how the metro system works."

While a train miniature was used for a spectacular crash sequence, all other shots of the monorail feature a completely digital train system. In this shot, only Narrows Island was created as a miniature – the rest of the skyline is built from reference material shot in Chicago using Double Negative's new suite of proprietary HDR photogrammetry tools. LIDAR data was utilised, but only to scan sets built in the UK and for a couple of exterior locations in Chicago.

"Every single building features detailed rooms generated with *Windowbox*, a special shading tool that created 3D shapes entirely from wide-angle textures of actual interiors," says Franklin.

A random approach to placing lit windows was tried, but this didn't help to convey the form of each building. "The patterns and colour temperatures help define them and give the city its character," says Franklin. "Residential buildings have a random pattern of warm lights, whereas offices have regular grids and things like tungsten lighting."

"The plate for the Monastery was shot in Iceland, but the landscape didn't fit the design of the miniature," says Franklin. "We used *boujou* to matchmove the plate, extracting points which we [illegible]

Negative team got to work using Senate House in London to test out a photogrammetry-based modelling approach: "We shot high-res digital stills in flat lighting conditions and at night under floodlights, tiling up an image 20,000 pixels across," says Franklin. "We also filmed it using the same stock and lenses chosen for the movie."

> "I spent four weeks in Chicago, 1,000 feet up for much of the time, or else photographing kiosks, benches, newspaper machines and trash cans. I did get some weird looks!" PAUL FRANKLIN, VFX SUPERVISOR, DOUBLE NEGATIVE

The team then worked on reconstructing the building in digital form, refining it until people actually began choosing the digital version in blind tests. The same techniques were then ready to apply to the vast expanses of Gotham using a library of some 2,000 buildings, each an exact match to a real one in Chicago.

"R&D Supervisor Oliver James developed a whole suite of photogrammetry tools with which to recover geometry from the photographic datasets and re-project high-detail textures back on," says Franklin. "Our Senior Programmers, Ted Wayne and Jeff Clifford, then put together a panoramic data pipeline, which allowed us to go on set and create massive panoramic tiled plates using a long lens to capture a very small area with each shot, sometimes building up a full 360-degree view."

Rather than using an off-the-shelf program to stitch all these textures together, Double Negative put together its own tool, dubbed *Stig*. Unlike other solutions, *Stig* is resolution independent: "It produces an instruction set rather than a single image, so that only the bits that are needed from a panorama are pulled at any one time," says Franklin.

HOLY SURFACE ATTRIBUTES, BATMAN

Building a digital city was one thing; lighting and rendering it was quite another. While the use of HDR helped when matching virtual lights to those in the live footage, dealing with all the surface attributes of the cityscapes required a number of custom solutions. "With the city at night, there's a lot of glass to deal with," says Franklin. "The buildings are defined by their reflections, which glitter, shimmer and 'climb up' the facades. Each building sparkles in a different way depending on the size of its windows, the type of glass used, what it's reflecting and so on. This is not something you can capture with a straightforward ray pass."

Tracing multiple bounce passes wasn't feasible for such complex scenes either, so Double Negative's shader developers, led by Samson Kao, produced a comprehensive architectural shading and lighting toolset.

"For the reflections, we came up with a virtual lighting card system," says Franklin. "It's a little bit like a very sophisticated environment mapping system, but rather than sticking things into a sphere, we placed high-detail textures in a coordinate system to position in 3D space. So we were able to use a single raytrace pass in *RenderMan*, but the results respected occlusion."

A new tool, *Windowbox*, was used to apply windows, with the glass matching the distortion patterns of any photographic reference, also replicating the complex inter-reflections of double-glazing. Each window could also be individually dressed with mullions, blinds, curtains and even dirt on the glass: "For the room interiors we thought about building 3D boxes, but that was impractical. Instead, *Windowbox* uses a pseudo-3D parallax texture cheat. We took super-wide-angle photos at 7K resolution of about 100 different office interiors at night, capturing a 180-degree angle view of each. *Windowbox* author Dan Evans then came up with a shader to analyse the angle of incidence from camera to window, working out the appropriate pixel to use

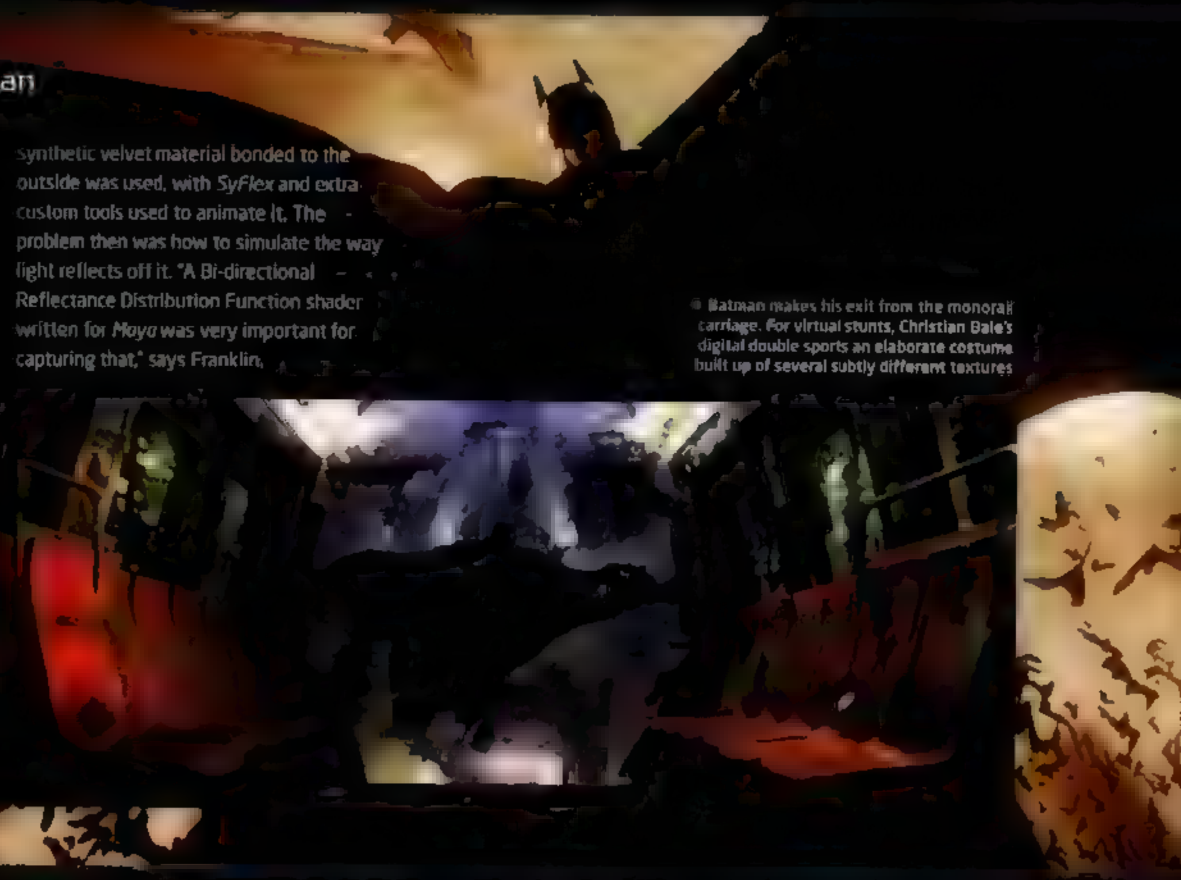
The digital stunt double was used for when the Batcape transforms from flowing cloth to the hang-glider-like flying rig. Cloth simulation was achieved with *Syflex* and Double Negative's own tools

IN FOCUS | Building Batman

Although the majority of action sequences feature elaborate stunt work, some sequences required a digital caped crusader. To create a suitably detailed stunt double, Christian Bale was scanned and photographed. The model was then refined until it was indistinguishable from the source material, even at full screen. This was then animated frame by frame using live stunt footage for reference. But matching the Batsuit and cape proved somewhat more challenging.

"The costume is built using several subtly different textures," says Double Negative's Visual Effects Supervisor, Paul Franklin. "We were sent all these swatches, with all different types of Neoprene and latex rubber, but only a few of us were allowed to see the costumes, so it took some work to find out what went where."

For the cape, director Chris Nolan wanted something mobile and expressive, so a design with nylon on the inside and a synthetic velvet material bonded to the outside was used, with *SyFlex* and extra custom tools used to animate it. The problem then was how to simulate the way light reflects off it. "A Bi-directional Reflectance Distribution Function shader written for *Maya* was very important for capturing that," says Franklin.



● Batman makes his exit from the monorail carriage. For virtual stunts, Christian Bale's digital double sports an elaborate costume built up of several subtly different textures

from the texture. We only expected to use it for background detail, but we got up really close in places and it held up well."

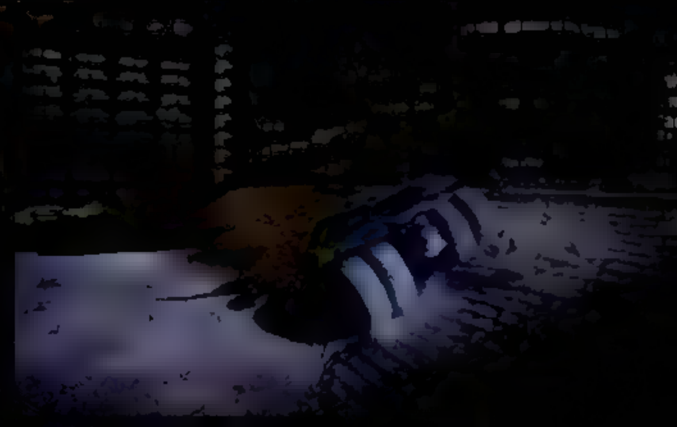
Another tool developed for the show was *Plane-It*. "This allowed us to use 3D matchmove and camera info within a 3D environment in *Shake*," says Franklin. "It was very important for creating window views from inside the train during a fight sequence. There are nearly 100 of those shots, and while a generic effect wouldn't have been good enough, it would have been too laborious to do each one bespoke. *Plane-It* allowed us to render off with a series of camera angles, then combine those with the live action in the 3D compositing environment."

The *Maya* artists, meanwhile, were given the ability to view real time previews for texturing and reflection placement using *Maya's* hardware renderer, avoiding the need to constantly render out test files. Yet another custom program, multipass rendering toolset *REX*, was developed as an alternative to off-the-shelf *Maya-to-RenderMan* app *MTOR*. "There's nothing complicated for the artists to learn with *REX*: they work in *Maya* as usual. But it's able to handle the thousands of buildings in our scenes and tightly integrate with our asset management tools."

STRONG, SILENT TYPE

The payoff for heavy investment in R&D and such dedication to photorealism through complex photogrammetry, modelling, reflection and lighting work is a movie that not only exceeds audience expectations but also satisfies the exacting demands of a director who has always remained sceptical and dismissive of the value of digital visual effects: "Nolan reversed his position on everything that had originally been anathema to him," says Franklin. "At the preproduction stage, he was adamant that he wasn't going to use a digital Batman or rely on digital landscapes. In the end, the final shot of the movie shows a digital Batman sweeping over a digital city.

"Of course, a lot of people watching the film aren't even aware that there are digital visual effects in there, which is quite a compliment, if a little frustrating. But it's great to work on a project that pushes the limits of what you can do and gives you the opportunity to come up with effects that people haven't seen before. This may be a big, noisy action flick, but it's also a strong piece of film-making – a very different approach to the typical summer blockbuster." ●



● This rooftop chase is one of the key action sequences. To the miniature shot, Double Negative added CG tiles, the entire 3D city environment, complete with reflections, and even a busy freeway in the distance.

Batman Begins is now on general release. More details about Double Negative can be found at the URL below
[w] www.dneg.com

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ENDORPHIN

crash testing

Leap tall buildings! Stop speeding bullets! Make it look like it hurts! Thanks to our CD software, your characters can perform all of these death-defying stunts – without any keyframe animation! **BY CHRIS OLLIS**

This month's cover disc contains an exclusive demonstration copy of *endorphin 2*. For those of you who have missed our reviews of this fantastic piece of software, *endorphin* is a 'Dynamic Motion Synthesis' package. It uses revolutionary AI and biomechanical techniques to simulate the way in which the human body moves, and the way it reacts to external stimuli. In other words, it enables you to control a virtual stuntman with a big brain and a love of acting. It's also the most fun you can have in the studio while remaining in a legal state of mind.

endorphin is a product that I love to get my hands on at every given opportunity. It works in a way that you wish all 3D applications would, being simple, intuitive and – assuming that the sight of CG characters being knocked down, blown up and treated in other cruel and unusual ways brings a smile to your lips – more enjoyable to use than you would think possible.

The software has been designed to create realistic human motion data that's beyond the abilities of motion capture studios or of real stuntmen, for that matter. It can simulate falls from a thousand feet, blows to the head from a baseball bat, and countless other stunts that would be far too dangerous to perform in reality.

ENDORPHIN RUSH

Although the demo version is export-limited, a fully licensed copy enables you to export data via the various motion capture file formats (ASF, BVH, FBX and so on) and used in your 3D application to drive a character. Put simply, it places the power of an entire Hollywood stunt team in the hands of an independent animator.

This tutorial will introduce you to *endorphin's* general workflow, highlighting its intuitive approach and fascinating results. We'll run through a quick and fairly basic simulation that will introduce the idea of forces and behaviours, before moving on to more complex projects that will demonstrate the vast number of possibilities available. You can find all of the accompanying project files and animations on the CD, plus a number of bonus tutorials supplied by *endorphin's* developer, NaturalMotion.

Chris Ollis works as an animator at games company Codemasters. He likes to push stuntmen down the stairs whenever he gets the chance
[w] www.intertwined.co.uk

FACTFILE

FOR
endorphin 2

DIFFICULTY
Easy

TIME TAKEN
One hour

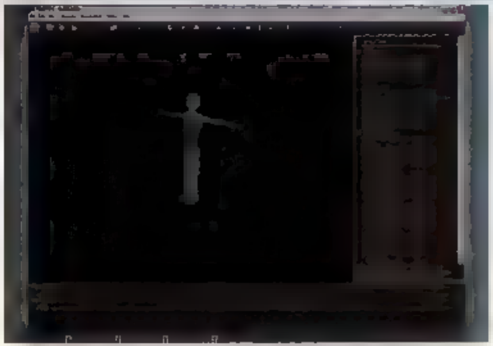
ON THE CD
- Full-sized screenshots
- Start and finish scene files for each section of the walkthrough
- Final animations

ALSO REQUIRED
N/A

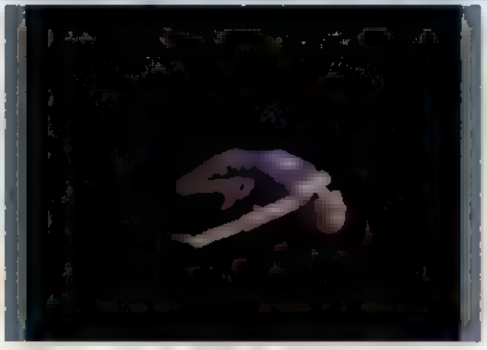
ON THE CD

- Exclusive demo of *endorphin 2*, plus full project files SEE PAGE 114

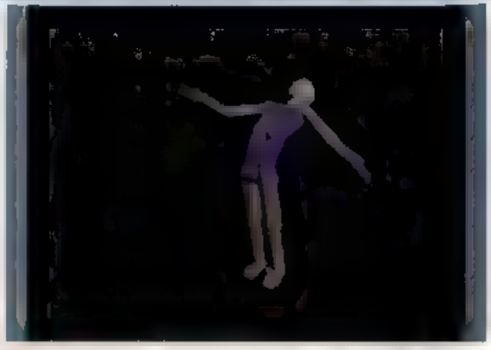
STAGE ONE | Mastering the basics



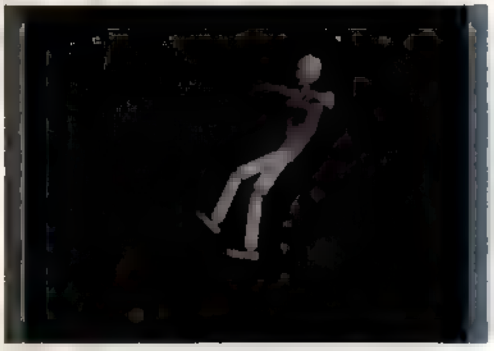
01 Once you've installed and run *endorphin*, you should find yourself looking at the software interface with a character standing before you, ready for action. It's incredibly quick and easy to get results from *endorphin*, so let's crack on and try out some of the basic functions with forces and behaviours.



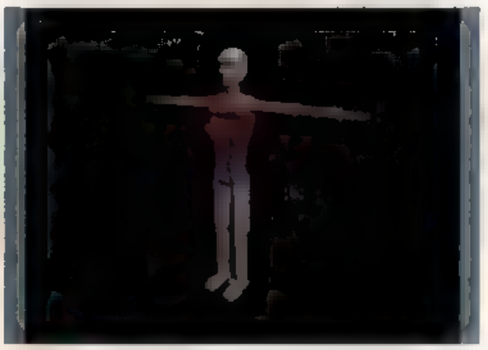
02 First of all, click the Simulate button on the Transport bar at the bottom right of the screen. Gravity should now kick in and the lifeless character will bend and fall to the floor. We'll start by adding a simple behaviour that will keep him upright for longer and provide a slight pause. To do this, right click on the Timeline next to where it says Character01.



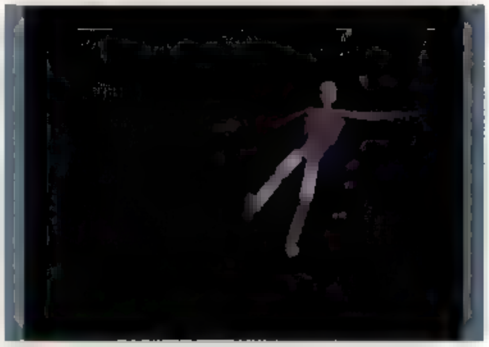
03 From the list of options, select Create Behaviour. An orange block will appear, labelled Arms windmill 2.0, with numbers to either side. The numbers are the animation frames between which this behaviour occurs, and the text describes exactly what the character will do. Hit the Simulate button again to see the effect.



04 The result is vaguely amusing, but it's not what we're looking for here, so select the Behaviour block. On the Property View panel to the right, click where it says Arms Windmill 2.0 and change it to Stagger 2.0. Now make sure the Behaviour Block is starting at frame 0 (just drag it across if need be) and extend it to finish at frame 200. Now press Simulate.



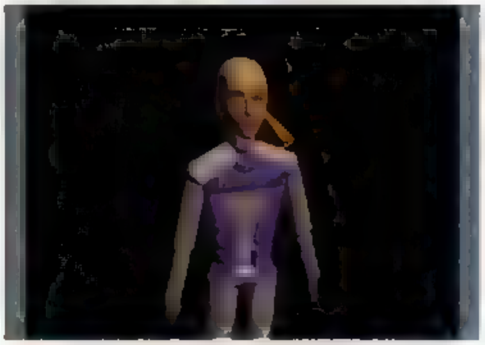
05 Our character now drops his arms to a more natural pose and wobbles a bit before tottering off to one side. That's great, so now let's hit him! Right click on the Timeline again, but use the next bar down to keep things clear and select Create Force. An orange triangle will appear on the timeline, along with a 3D arrow, protruding from our character's chest.



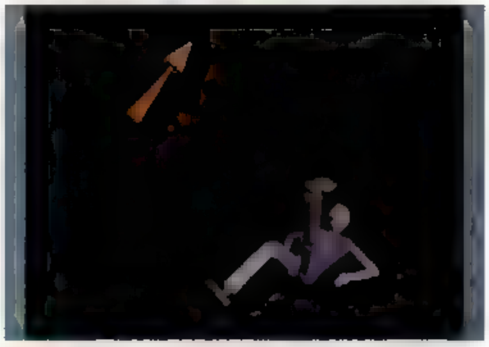
06 Drag the Force Event triangle to frame 80 and hit Simulate. You should see that the character now takes a knock to the chest which pushes him backward. The stagger behaviour that previously caused him to lurch to one side now adapts and tries to keep him upright as he moves backwards. Note that no keyframing is needed to achieve this effect.

High-speed navigation

Navigation is essential in a 3D package, so here's a quick guide to *endorphin's* simple control system. The main controller is the middle mouse button. Hold it down to rotate the viewport and scroll it up and down to zoom in and out of the scene. Combine it with the [Alt] key and you can shift the view around. Other functions to remember are [Ctrl]+[F], which zooms the viewport to the currently selected object, and [Ctrl]+[R], which will reset the view. Using these, you should be able to move about as fast as *endorphin* can run its simulations!

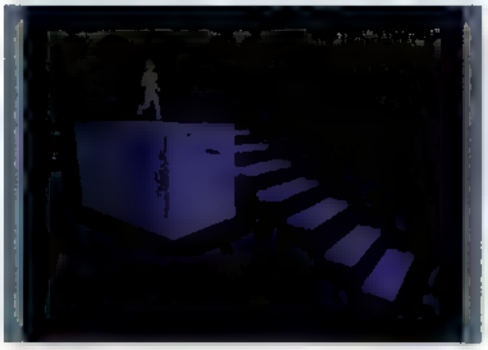


07 Let's play with the force a little. First of all, we'll push it up. Either select Scale from the Toolbar and enlarge the arrow, or, for more precision, drag the Strength spinner in the Properties panel. Let's give it a value of 15. Now we'll change the angle of impact. Select Rotate and Move from the toolbar and position the arrow as shown in the screenshot above.

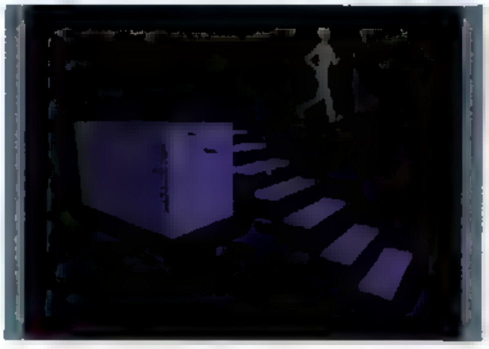


08 Finally, we'll change the body part that receives the force. With the force arrow still selected, click the orange Select link in the Properties panel and click on the character's head. If you wanted to, you could hold [Ctrl] down and select multiple body parts to affect. This would also amplify the force. Finally, hit Simulate and try not to laugh too much...

STAGE TWO | Importing motion data



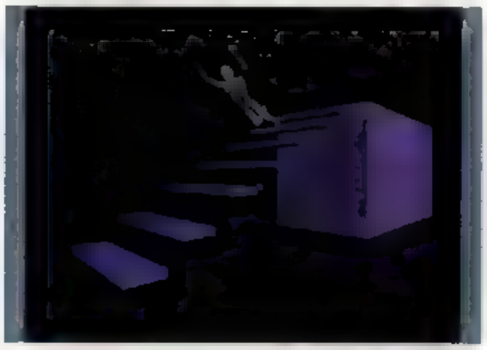
09 Having mastered the basics, we'll put theory into practice and take the effect a little further. Load the file Part2Start.ens from the disc. It contains a roughly modelled platform with some steps. There's also an *endorphin* character in a T-stance at the top. If you press the Simulate button now, you'll see that he has some motion capture applied.



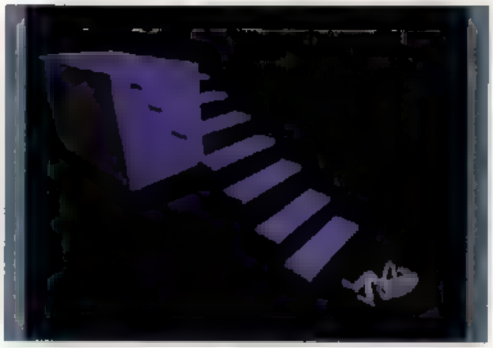
10 The motion-capture data is a simple jog animation that controls the stuntman's movements rigidly. In other words, he doesn't have any dynamic simulation interfering with the imported motion data. This is great while he's on top of the platform, but a little odd when he starts jogging in the air like Wile E. Coyote!

11 Let's bring him crashing down to earth. Scrub the timeline to the point when his foot is over the first step: frame 84 is good. Now right click on the timeline above the jog.fbx bar. Select Create Simulation Event and line it up to frame 84. This will override the motion capture at the selected point and start to perform the usual *endorphin* dynamic simulation.

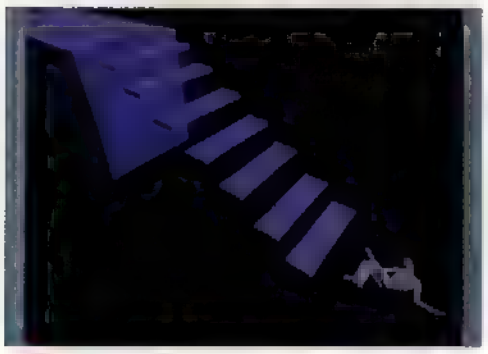
12 With a quick click of the Simulate button, you should see the horrific results. This simple combination of realistic motion capture data and the most basic of *endorphin* simulations should demonstrate the sheer power of the package as a motion-synthesis tool. After all, how many real stuntmen would be willing to do this for you?



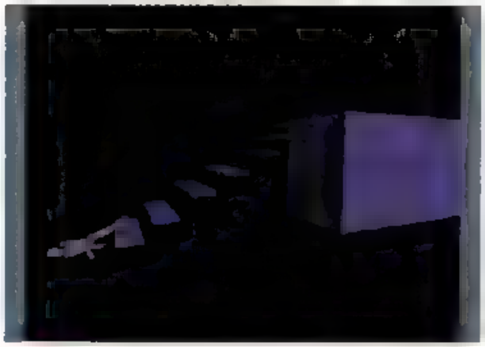
13 Of course, that's only the beginning. Now let's start adding behaviours. Below the jog.fbx bar on the timeline, right click and select Create Behaviour. Replace the default Arms Windmill 2.0 with Arms Raised Above Head 2.0. Set it to start at frame 84 and finish at about 150. Now run the simulation to see the difference a subtle move can make.



14 A single behaviour is nowhere near the limit of *endorphin's* possibilities, so let's carry on. Right click again next to the Arms Raised... behaviour and select Create Behaviour. This time, pick Body Foetal from the list. Set the start time to 150 and end to 200, then click on Simulate. You should see the character try to tuck up into a protective ball as he nears the bottom of the stairs.



15 Finally, we'll add one more behaviour. This time, pick Arms Wide of Head from the list and place it at the end of the animation, running between frames 190 and 250. Hit Simulate one last time and you should see that the character puts his arms out wide, causing the upper part of his torso to turn over to a rest pose.

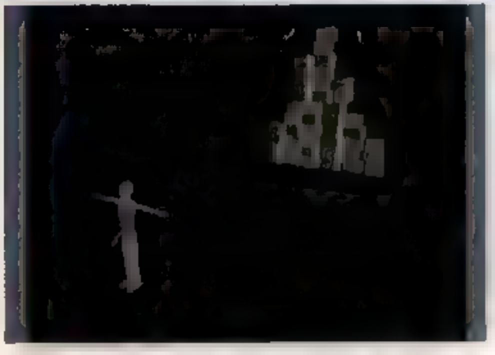


16 By now you should hopefully have seen how subtle yet powerful *endorphin* can be. By layering motions of varying strengths, you can cause bodies to twist and turn, or simply go limp at various points in an already complex motion. Even better, we've done all this without needing to use any tiresome keyframing!

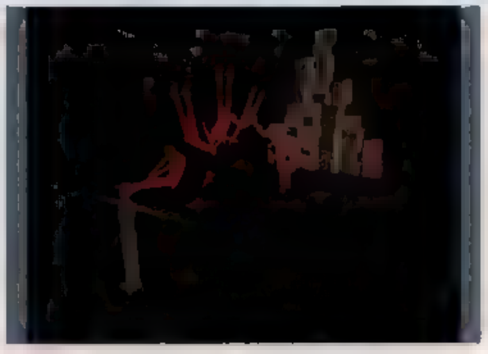
Going further

Endorphin is packed with far more features than we can possibly cover here. Other major techniques include using multiple characters to create body-contact footage, extra dynamic objects that can be strapped onto a character's body to change its proportions or to simulate bulky armour, and a simple yet powerful pose-to-pose animation system that produces staggering motion data when combined with dynamic simulation. There are also plenty of subtle functions that unfold as you use the package. For details, see the accompanying tutorials on the CD.

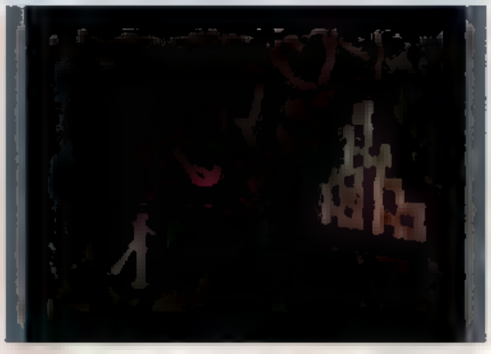
STAGE THREE | Getting violent



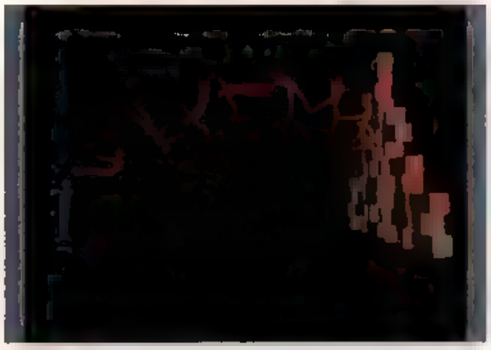
17 For the next part of this tutorial, we'll up the level of violence still further and try to perform a proper Hollywood-style stunt. To begin with, open the file Part3Start.ens from the CD. It contains our character, a force event and a very large stack of boxes.



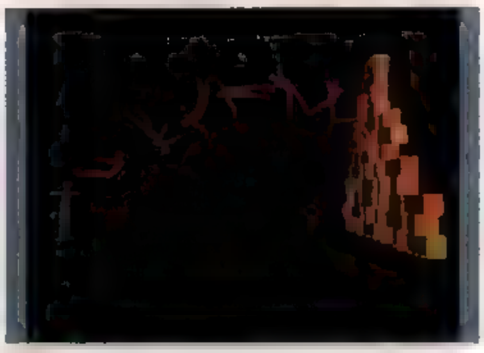
18 This calculation may take some fine tuning, so run the Simulation and then turn up the Strobe Range spinner at the bottom of the viewport to about 200. You should see a series of red ghosted characters appearing. This is an interactive display of the coming animation that provides instant feedback on all our future adjustments.



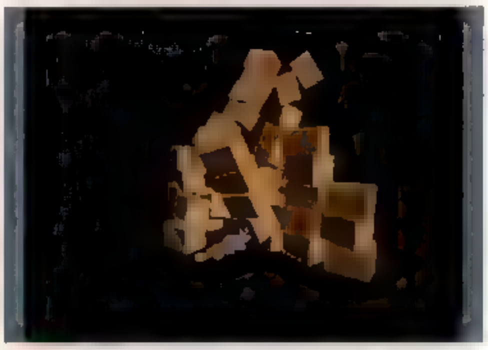
19 You should first notice that the character doesn't quite reach the boxes, so we'll start there. Select the Force arrow and, in the Properties panel, change the Strength to 50. The Strobe view will update and show you that this is far too hard. A strength of 36 should make the character land exactly where we want him to: just above the middle of the boxes.



20 We don't want him to be completely lifeless, so let's add some behaviours. Right click in the Character timeline and select Create Behaviour. First choose Writhe In Mid-Air 2.0, crank its strength up to 1 and set it to run from 50 to 130. Now add a Fall Back, Twist And Catch Fall to run from 130 to 200.



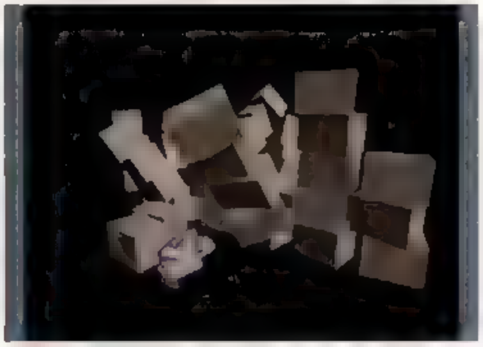
21 The wall is currently a solid object. This is because I've disabled it using a Simulation Event (the triangle on the Environment timeline). By applying these Events to objects or characters, you can simply turn them off from the simulation or, as in this case, allow other objects to bounce off them without causing them to fall themselves.



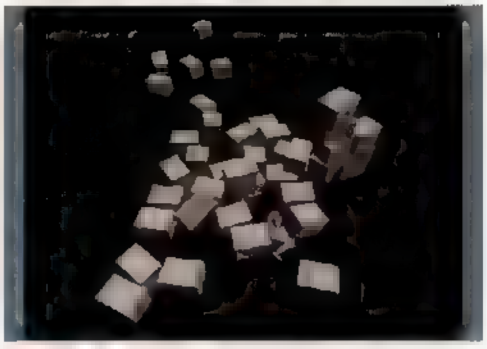
22 It's time to turn the boxes back on, but first take the Strobe back to 0 or the calculations will slow it down too much. On the Environment timeline, right click and select Create Simulation Event. The default property is Full Simulation, which will start up the dynamic solving on the boxes again. Make it start just at the point of impact (try frame 120) and hit Simulate.

Asset repurposing

A much overlooked use for *endorphin* is its ability to revitalise existing mo-cap data. By applying some of its tricks to a stock move, you can quickly create dozens of variations on the initial theme. For example, you could add a catch motion or a fall to a standing pose, an impact to a fight sequence, or simply add an object to a walking character's arms to change the walk cycle into a carrying motion. Subtle variations can turn one mo-cap file into ten, and the possibilities are almost endless. *endorphin* lets you breathe new life into your old mo-cap data.

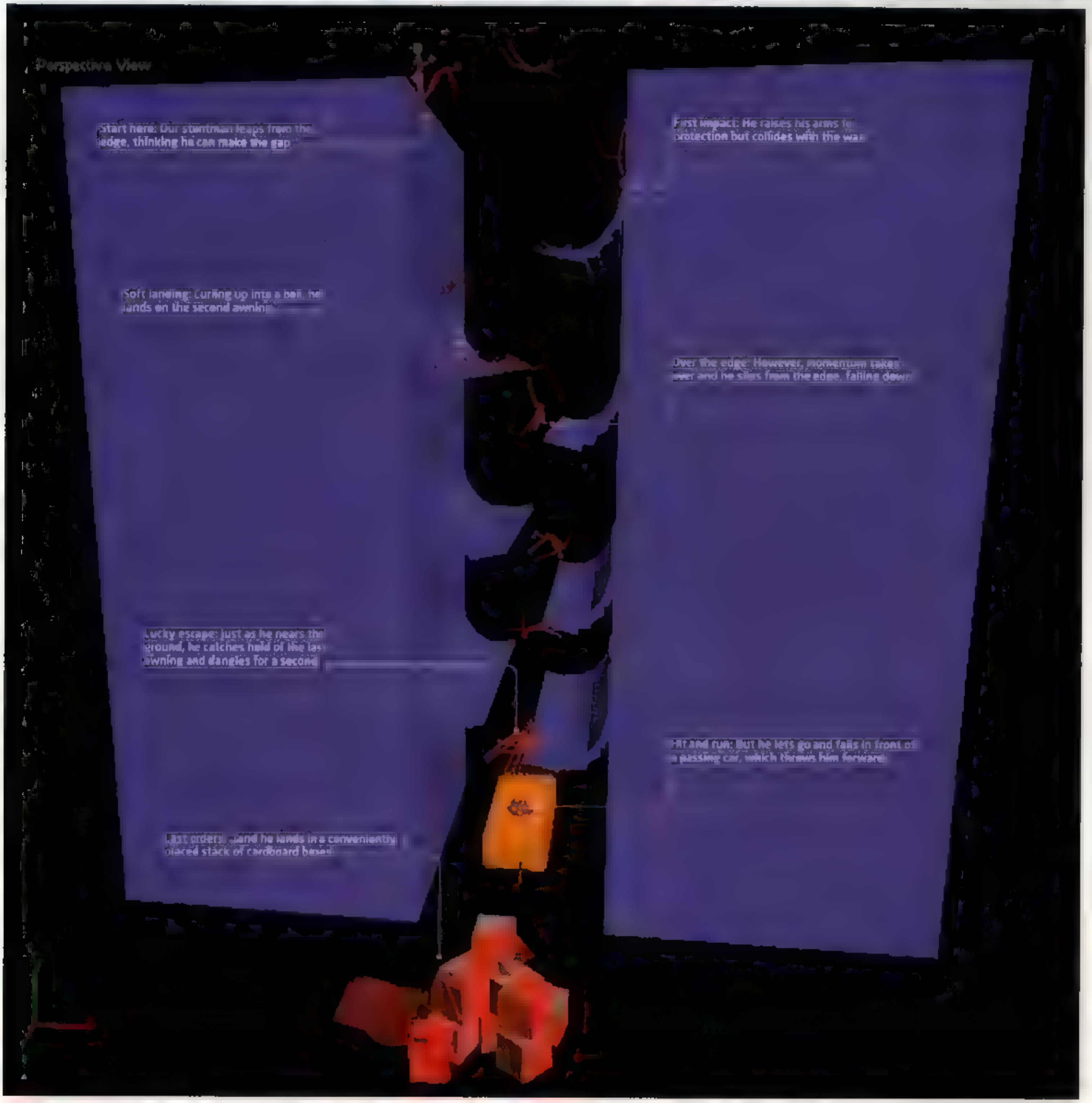


23 The character should react as the boxes crash down around him, so right click the Character timeline and add a Body Foetal behaviour. Start it at about frame 280, just as he realises that the boxes are going to fall on him. It shouldn't matter too much where you stop it because this is his final movement and he'll retain that shape.



24 We could add some force damage to the poor guy as the boxes bounce off him, but I think he's suffered enough for today. By now you should have mastered the essentials of *endorphin*, which means it's time for you to experiment for yourself. In the final section of this tutorial, we'll show you a particularly stunning stunt. Your challenge will be to get the virtual stuntman to recreate it...

STAGE FOUR | Thinking bigger



Start here: Our stuntman leaps from the edge, thinking he can make the gap

Soft landing: Curling up into a ball, he lands on the second awning

Lucky escape: Just as he nears the ground, he catches hold of the last awning and dangles for a second

Last orders: ...and he lands in a conveniently placed stack of cardboard boxes

First impact: He raises his arms for protection but collides with the wall

Over the edge: However, momentum takes over and he slips from the edge, falling down

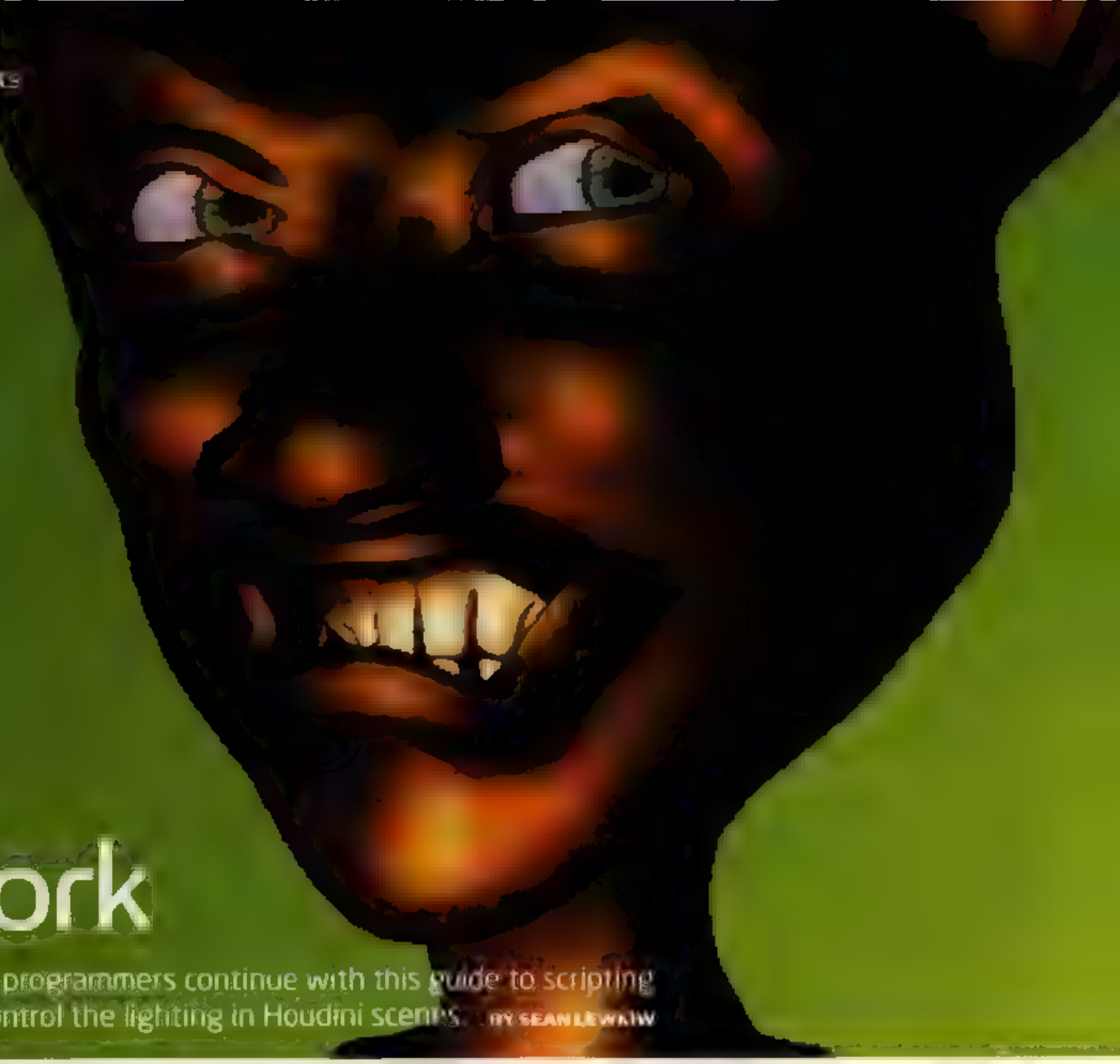
Hit and run: But he lets go and falls in front of a passing car, which throws him forward

25 The scene we'd like you to try to emulate is slightly more advanced. It's certainly nowhere near the limits of what *endorphin* can do – there's still only one character and no data retargeting – but it's a good example of what can be achieved with a minimum of fuss.

To begin with, let's run over the scene. It's all made with basic endorphin collision objects, scaled and positioned to provide a dummy environment to bounce off until the data reaches a 3D package. For the stuntman, I used a simple jump and dive behaviour to get him moving, bolstered by a minor kick to his behind for some extra distance in his leap.

Bar some behaviours to provide body motion, the rest is pretty much *endorphin* doing its thing… that is, until near the end, when I applied a restraint to his right hand so that he could catch the last awning in the hope of salvation. His hold doesn't last, though, and he falls to the ground, only to receive a large kick from the car marker. This sends him flying into even more stacked-up boxes.

The start file (MassiveStuntStart.ens) is on the CD, so try recreating this scene. If you get stuck, load the final stunt (MassiveStuntFinish.ens) to study the necessary settings. ●



HOUDINI

Light work

Our articles on coding for non-programmers continue with this guide to scripting a custom interface panel to control the lighting in Houdini scenes. BY SEAN LEWKIW

One of the great features of *Houdini* is its ability to combine its native hscript with almost any other scripting language, enabling the user to create interactive interfaces that talk directly to the software. In this article, we will take a look at one such example, exploring the process of using Tcl/Tk to build a 'light lister': a custom panel that will enable us to control each individual light in a scene at the flick of a button.

Before starting scripting, it's always a good idea to sketch out the design for an interface, and what features it should contain. There isn't space to go into this in detail here, but the finished script (lightbox.tk, included on the CD) contains a full description of the feature set, to which you can refer.

Over the course of the article, we will start with a very simple core script, then build upon it. The scripts corresponding to each stage of the process are included on the CD, so if you want, you can copy them to your *Houdini* scripts directory (as explained below) and run them from there. However, it's a good idea to type each one from scratch. You will learn much faster this way.

THE BASIC SCRIPT

Before we start, we need to know where to put Tk scripts. *Houdini* will look for scripts anywhere in the HOUDINI_PATH. In a shell, type **echo $HOUDINI_PATH** (In Windows, right-click the My Computer icon and choose Properties > Advanced > Environment Variables.)

On my Linux box, this generates the result /usr/cg/users/seanl/houdini7.0 /studio/RnD/rh9/houdini7.0 /usr/cg/projects/generic/houdini /usr/local/packages/rh9/houdini/7.0/houdini. The path will be different on your machine, but you can see that *Houdini* will look in its home directory first. Therefore, if I create a directory called /usr/cg/users/seanl/houdini7.0/scripts/tk, *Houdini* will look for Tk scripts in scripts/tk under the base *Houdini* path.

We are now ready to begin scripting. To begin with, we'll create a very simple interface that does nothing but turn everything in the scene off. Start a new text file and save it as lightbox1.tk in your scripts directory, as discussed above. First, let's create a frame for our interface containing an "All Off" button and a "Quit" button.

```
frame                   .top
pack      .top
```

What we've done here is create a frame called ".top", then "packed" that frame. Packing a frame means building it, or actually displaying it. Your frame names must begin with a "." and must not have a number after the dot. The tabs in the code are only there to make it easier to read, and do not affect the syntax. Next, let's add the buttons for the interface.

```
button    .top.quit      -text "Quit"       -command exit
button    .top.alloff    -text "All Off"    -width 10
```

Note the buttons are children of the frame ".top". We place the words in them with the "-text" option, and can specify a width with the "-width" option. The "-command" option tells the button what to do when pressed. Now let's display everything using the "grid" command:

```
grid      .top.quit      -row 0             -column 0
grid      .top.alloff    -row 0             -column 1
```

FACTFILE

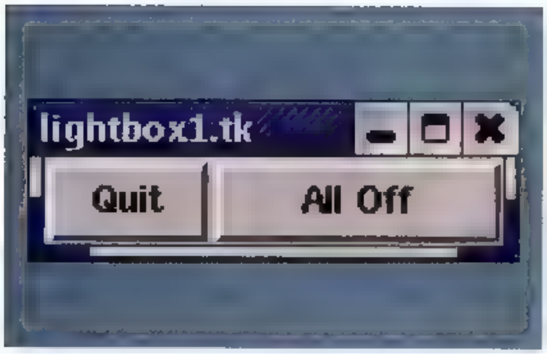
FOR
Houdini version 6.0 onwards

DIFFICULTY
Intermediate

TIME TAKEN
One hour

ON THE CD
- Full-sized screenshots
- Completed scripts
- Extended version of this article

ALSO REQUIRED
Nothing



● The custom interface panel created by the lightbox1.tk script (see below). It may not look very impressive, but it's the seed of something much more sophisticated, as the next image demonstrates...

This is similar to the "pack" command, but offers more control over the placement of rows and columns. Run this script from *Houdini* and see what happens. Start the application from a shell so that you can see any error messages. In *Houdini*, open a textport and type **tk lightbox1.tk**. The interface should pop up, looking like the image above. Nice, isn't it?

If you see a "no such file..." error in the shell you started *Houdini* from, you've either typed the command in wrong (is your file called lightbox1.tk?) or you've put the file in the wrong place (is it in your *Houdini* path?). If all else fails, type **tk /path/to/file/lightbox1.tk**.

At the minute, pressing the "All Off" button will do nothing, although pressing the "Quit" button will indeed quit the utility. Let's add a *Houdini* command so that the "All Off" button works. At the very top of your script, add the following code:

```
proc all_off {} {
        hscript opset -d off /obj/*
}
```

Now add "-command all_off" to the end of the last line so it looks like this:

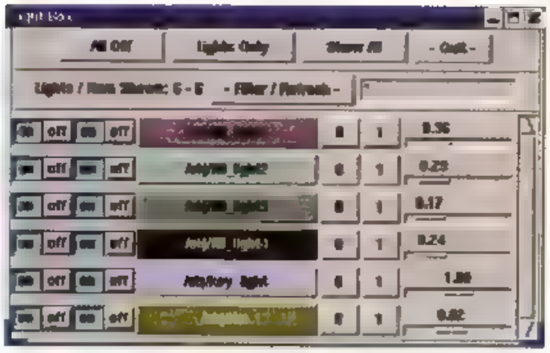
```
button .top.alloff -text "All Off" -width 10 -command all_off
```

The new file is lightbox2.tk on the CD. Try running it in *Houdini*. If you press the "All Off" button, all the objects in your scene should turn off. Let's run through what we did. We created a procedure (proc) called "all_off". This is a little snippet of code that can be run by pressing a button or from another procedure. The next two curly brackets are where you would define any arguments that it might take (more about this later), and the next open curly bracket means that "everything from here to the next closed curly bracket is the guts of this procedure". The line in the middle forms those guts, and the reserved word "hscript" means that "the command that follows is not a Tcl/Tk command: it's a *Houdini* command". Therefore, when you press the button "All Off", the proc "all_off" is called and the code inside is executed. (If you're wondering how we selected the "opset" command, read the box on the right of the page.)

GOING DEEPER

Now let's add buttons to the interface representing each light. We need a place to put these buttons, so let's create a new frame:

```
frame [illegible].lights
pack [illegible].lights
```



● ...because here's the completed light lister panel. You can find a more detailed explanation of what each button on the interface does in the annotations within the lightbox.tk script supplied on the CD

The next thing we need to do is make a list of all the lights in the scene. Let's create a new proc. This time, I will explain what I am doing by way of comments. In the text below, any line preceded with a "#" is considered a comment and is ignored by the script.

```
proc findlights {} {
   global lb

   # This makes a list of all the lights in the scene
   set temp1 [ hscript opfind -t light ]

   # This makes a list of all the ambient lights in the scene
   set temp2 [ hscript opfind -t ambient ]

   # Make a list that includes ambient and normal lights
   set lb(listoflights) "${temp1} ${temp2}"

   puts $lb(listoflights)
}
```

Clear as mud? Let's run through what we just did in more detail. First of all, we declared a "global" variable which we called "lb" (standing for "lightbox"). This means that "lb" is available for use outside of this procedure. If we hadn't declared it as a global, it would not be recognised anywhere but inside this proc.

For example, the variable "lb(listoflights)" contains a list of all the lights in a scene. There's no point in keeping this juicy information inside the procedure (that would be like asking someone if they knew the time and having them answer "yes", instead of telling you that it was 11.15!) Instead, we need to let the rest of the utility know about it. Therefore, we make it global.

However, just listing the lights doesn't do us any good: we also have to store that list. So we set a local variable (that is, one only available within this procedure) called "temp1". This stores our data. If we knew that there was only ever going to be one light in the scene, we could have written:

```
set temp1 "light1"
```

However, this would severely limit the scope of the utility, to say the least. Instead, we need to query *Houdini* to see how many lights there are in the scene at the time of running the script. Therefore we made "temp1" equal to the result of the command "hscript opfind -t light". In plain English, this means that the value of "temp1" is the answer to the question, "How many lights are there in my scene?

Finding Houdini commands

So, how did we figure out which *Houdini* code to call in the lightbox1.tk script? If you go to your textport and type "help", you will be deluged with a thousand different hscript possibilities. It would take you forever to find the "opset" command and know how to use it. Luckily, there are easier ways. Suppose there is an object in your scene named "geo1". Again in the textport, type:

```
opscript /obj/geo1
```

The "opscript" command basically shows you the code necessary to create any *Houdini* operator. You will see a lot of code produced, but at the end of it, you will see something like:

```
opset -d on -r off -h off -f off -y
off -t off -l off -s off -u off -c off
-C on -p on -e on -b off -x
```

So there's your opset command. You will see others as well, but "opset" and "opparm" are two of the most common and you will see them again and again. Now, you can type "help opset" in the textport, and find out what all of the different flags mean. In a nutshell, "opset -d on /obj/geo1" means "turn on the display of geo1". Similarly, "opset -d off /obj/*" means "turn everything off".

Debugging scripts

The Tcl/Tk "puts" command is your best friend. Use it liberally to see what is really going on inside your code: this will help you debug your scripts faster than almost any other technique you can use.

Next, we did the same thing to get a list of ambient lights. Then we created a new, final list of all lights, including ambient and normal lights, which we called "lb(listoflights)". Again, the "lb" means that this variable is global, which means that we can access it anywhere else in the script, whereas "temp1" and "temp2" are local, and not available outside of this procedure. Trying to access "temp1" in another procedure would result in a "no such variable" error.

Lastly, note the "puts" command. This prints out to your shell whatever follows the "puts", allowing you to debug your code. In this case, "puts $lb(listoflights)" simply means "print the contents of the variable lb(listoflights)".

The completed script is the file lightbox3.tk on the CD. If you run it within *Houdini*, the same interface will pop up, but in your shell you should see a list of all the lights in your scene.

ADDING DYNAMIC WIDGETS

Now let's put a button in the interface to represent each light. Make a new proc called "buildlights". On the CD, look at lightbox4.tk.

```
proc buildlights {} {
        global lb

        # Initialise a counter number
        set count 0

        # Go through each light
        foreach light $lb(listoflights) {
                puts "adding $light"

                # Create a button per light
                button .lights.${light}${count} \
                        -text "$light" \
                        -command "obj_on $light"

                # Pack the button
                grid .lights.${light}${count} \
                        -row $count \
                        -column 0 \
                        -sticky ew

                # Increment the counter
                incr count
        }
}
```

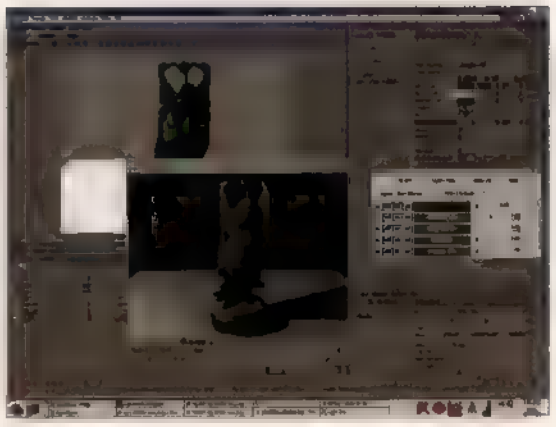
Let's look at the "foreach" loop in detail. We have a list of lights, and we want to loop through it and add a button to the interface for each light. First of all, we set a variable that represents the number of times we've looped in our foreach loop. To begin with, we set it to zero, as we've looped zero times.

Now, look at the line, "foreach light $lb(listoflights) {". This simply means, "for each and every item in the variable lb(listoflights), do something. At the end of the list, stop." Inside the loop, the current light is called, simply, "light", although this title is totally arbitrary. We could have called it "melvin" if we'd wanted to, by using the code:

```
foreach melvin $lb(listoflights) {
```

The next line adds a button called .lights.${light}${count}. This name will change according to the light in question. (For example, on the first loop, it will become something like ".lights./obj/light1".) This ensures that each button has a unique name. We have added a new procedure called "obj_on" which takes the argument of the name of the current light, which, if you check in the help file, turns the display of the object on.

Next, we packed the buttons, using the count variable to tell *Houdini* what row to pack them into. The "sticky" argument tells it to stretch the buttons out to each side of the frame so that they are all the same size. Finally, we incremented the variable "count" so that on the next loop, the value has increased by one and our buttons are on another row. Note the back slashes: these to allow us to continue one line of code over several actual lines to make it easier to read.

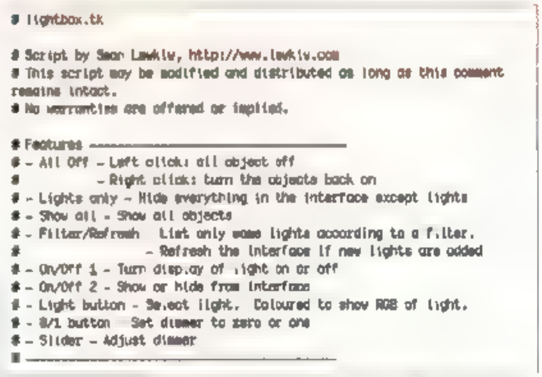


A sample *Houdini* scene, showing the light lister in action. Each light in the scene is controlled by a separate button on the panel (centre right)

FINISHING THE JOB

And that's it. This is only a very simple version of the light lister. On the CD, along with an extended version of this article, you can find a script (lightbox.tk) capable of creating a more sophisticated interface that enables the user to see the colour of each light at a glance, and to control its brightness with a slider. Each section of the code is annotated, so load the file up and experiment for yourself.

Sean Lewkiw has ten years of experience in CG, and worked on both the first two movies in the *Lord of the Rings trilogy*. His most recent role was as VFX Supervisor on *The Water Giant* at Jim Henson's Creature Shop in London.
[w] www.lewkiw.com



```
# lightbox.tk

# Script by Sean Lewkiw, http://www.lewkiw.com
# This script may be modified and distributed as long as this comment
remains intact.
# No warranties are offered or implied.

# Features ---------------------------------------
# - All Off - Left click: all object off
#             - Right click: turn the objects back on
# - Lights only - Hide everything in the interface except lights
# - Show all - Show all objects
# - Filter/Refresh   List only some lights according to a filter.
#                    - Refresh the interface if new lights are added
# - On/Off 1 - Turn display of light on or off
# - On/Off 2 - Show or hide from interface
# - Light button - Select light.  Coloured to show RGB of light.
# - 0/1 button   Set dimmer to zero or one
# - Slider - Adjust dimmer
# ---------------------------------------
```

To develop your light lister panel further, explore the file lightbox.tk on the CD. The script is annotated to explain how the code was developed

Quick tricks to refine your scripting skills

[illegible]

Don't forget to experiment. Being able to write good scripts and understand your software package more deeply than the average artist will make you infinitely more attractive to an employer.

[illegible]

Don't be afraid to re-use code and borrow liberally! Every single utility currently in use in CG can probably be traced back to one generic rename script written in 1984. If you've got something that works, use it again.

[illegible]

Some good resources for Tcl/Tk are www.tcl.tk and the Google newsgroup at http://groups-beta.google.com/group/comp.lang.tcl?hl=en. Finally, the Odforce website and my own site, www.lewkiw.com have more scripting examples on them.

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LIGHTWAVE

Boulder dash

Discover how to blend live-action video footage with CG to create an animated sequence that Indiana Jones would be proud of

BY BENJAMIN SMITH

FACTFILE

FOR
LightWave

DIFFICULTY
Elementary to
intermediate

TIME TAKEN
Two hours

ON THE CD
- Full-size [illegible]
- LightWave [illegible]
- Background footage [illegible]
- [illegible]

ALSO REQUIRED
After Effects

You know what it's like. You pop out to the local milliners to arm yourself with a stylish new piece of headgear and, returning titillated with your new titfer, you decide to take the short cut back. You know, the one past the ruined temple? Before you can say "ancient Inca curse", you're being harried back to the office by a humongous sphere of rolling rock that flattens everything in its path – not least the shiny new hat you've just spent your hard-earned cash on. Bloody Incas – they must have something serious against hats.

While death-defying stunts like this are, admittedly, fairly rare in real life, attempts to reproduce the illusion with computer graphics are more popular and slightly safer. To this end, we invite you to take a stab at the effect using the popular combination of *LightWave 3D* and *After Effects*.

This is a reasonably straightforward project with regard to both the 3D and 2D elements involved, and so it's a good starting point for anyone who's new to the process of incorporating CG elements into live-action moving backgrounds.

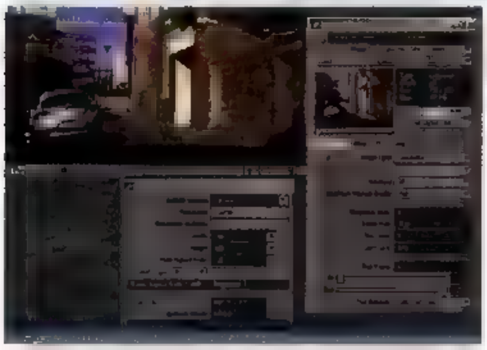
Over the following four pages of this tutorial, we'll be using some basic measurements taken from the location shoot to build a simplistic 3D model of the alleyway. We'll then line up a camera in *LightWave* so we can add the ball and animate it, so it can roll down with dramatic timing. We'll then render passes for both the ball and the shadow it casts on the ground.

LIKE A ROLLING STONE

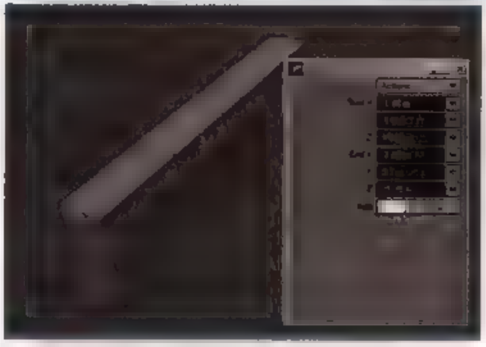
While simpler techniques would achieve the shadow merely by darkening the footage (sometimes within *LightWave* itself), here we'll use the rendered shadow information to do the darkening in *After Effects*, so we can get the same quality in the shadows as you can see in the footage. It's generally easier to tweak the look of details like this in a composite, and it saves you from potentially re-rendering the time-consuming 3D renders.

Benjamin Smith is Creative Director of Red Star, purveyors of Finest Sheffield Quality 3D animation and CGI effects
[w] www.redstarstudio.co.uk

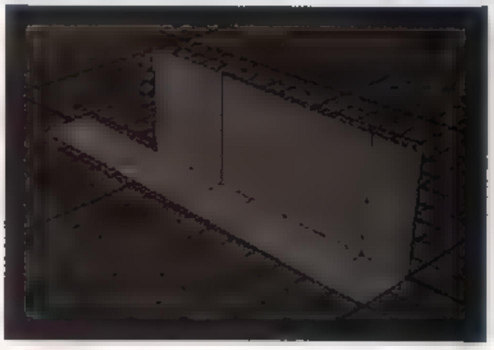
STAGE ONE | Rebuilding the alleyway



01 Open Layout and, in the image editor, load the background plate image sequence we've included on the cover disc. Set the camera resolution to 720x380 pixels and make the images the background in the Compositing tab of the Effects panel. In the Display panel, set Camera View Background to Background Image.

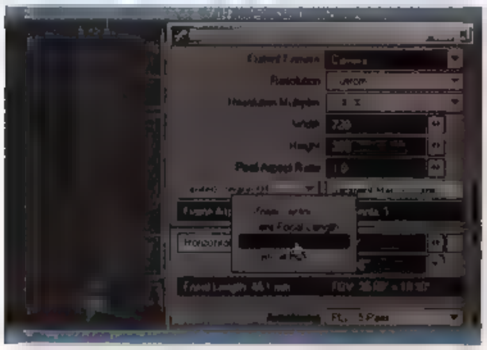


02 Load Modeler and, working from the reference images, drag out a box in the rear view that's 4.1m wide, over 8m tall and 20 metres long. One corner of the box should be at the origin, so you can use the knife tool from the numeric panel (press [n]) to knife in divisions corresponding to the distances we've drawn in the images.

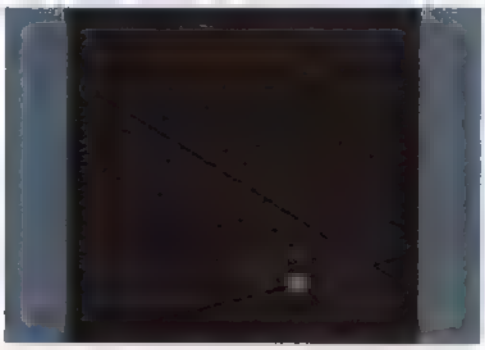


03 The alleyway is also sloping, although we couldn't measure this precisely on the shoot. For simplicity's sake, shear the model by 1m and then delete all the polygons except for the floor and the right wall. Save and load this model in Layout, setting it to Wireframe mode in the Scene Editor.

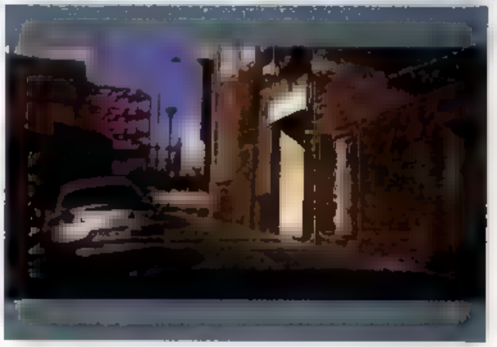
STAGE TWO | Lining up the camera



04 We took measurements from the camera to record the lens angle, so convert the Zoom Factor pop-up on the Camera Properties panel to Horizontal FOV and enter a value of 35 degrees. Now all you have to do is move and rotate the camera to line the Wireframe alleyway up with the background plate.

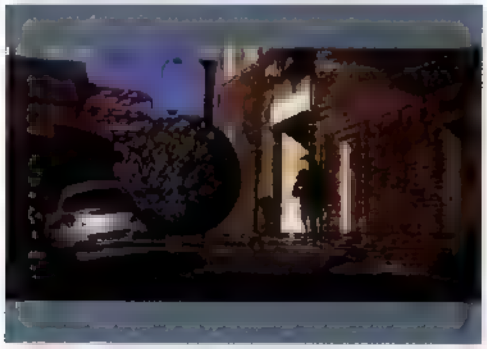


05 Set the camera's Y position to 1.3m, which is a rough tripod height off the floor. Position the camera just outside the set in its bottom left corner and tweak the position to get a good line-up.

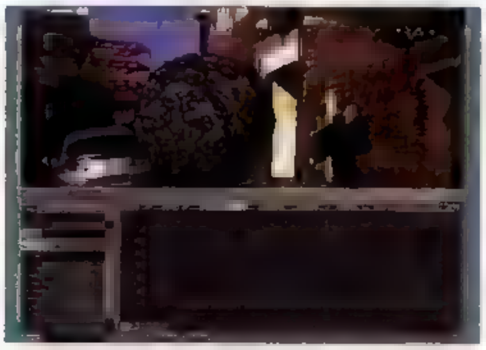


06 When you're happy with the line up, you can do some extra knifing in Modeler and Smooth Shift in the recessed doorway you can see, as well as the top of the wall on the right of frame. You'll need this extra detail to accurately cast a shadow later on.

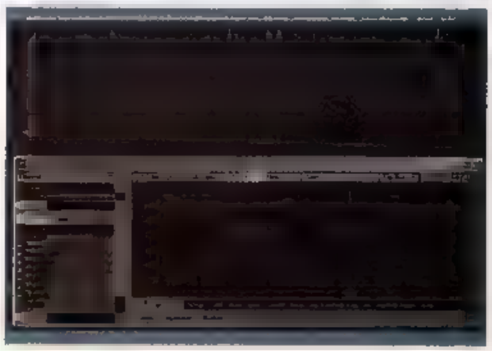
STAGE THREE | Animating the ball



07 Add a null, name it ball_position and, at frame 0, position it right at the top of the slope. Now add another null called ball_v001.lwo and parent that to ball_position. Load ball.lwo, which is provided on the cover disc and which is already textured. Parent it to ball_lift and then scale the ball so you get something that almost fills the alleyway. Now move ball_lift in Y as appropriate.

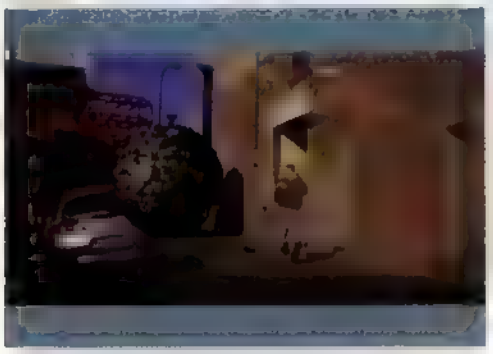


08 On frame 100, keyframe ball_position down to the bottom of the slope and, in the Graph Editor, set the Pre and Post Behaviours for the Position curves to Linear. Now you can select and drag the keys at frames 0 and 100 to adjust the timing on the ball's animation so that it follows the intrepid explorer down the alley and just misses him by a matter of inches.

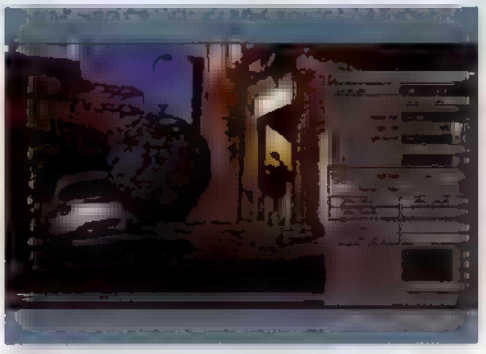


09 Add another null called ball_turn and parent it between ball_lift and the ball itself. Animate the Pitch channel of this null to simulate the effect of the ball rolling downhill. Add a key at frame 100 and slide the Pitch value up and down in the Graph Editor until the rolling movement looks right.

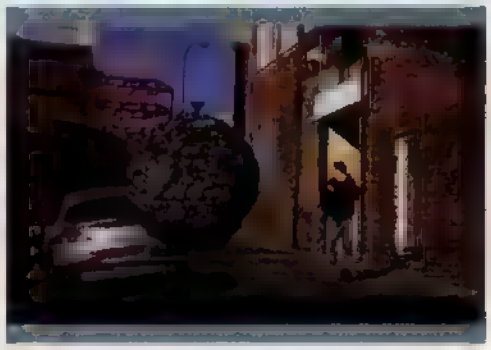
STAGE FOUR | Setting up the lighting



10 *LightWave* will have already created a default Distant Light, so turn on Raytraced Shadows in the Render panel and rotate the light to match the direction of the shadows in the background plate. If you set the surface on the alleyway so that it's 50% transparent, you can compare both the ball's rendered shadow and the shadows in the plate

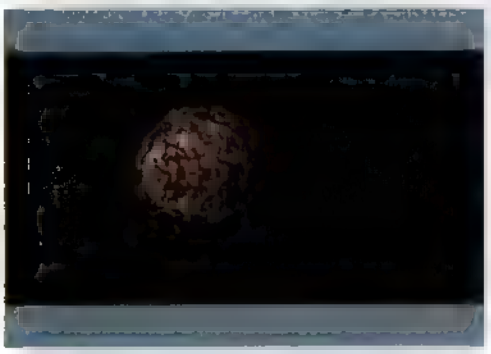


11 From the Global Illumination panel, set Ambient Light to 0%. Add a new Distant Light and rotate it to fill in the right side of the ball so it isn't in total darkness. It might help to make the fill lights slightly cool. Try a value of 191 210 255, and set the key light to a slightly warm colour, such as 255,249,235.

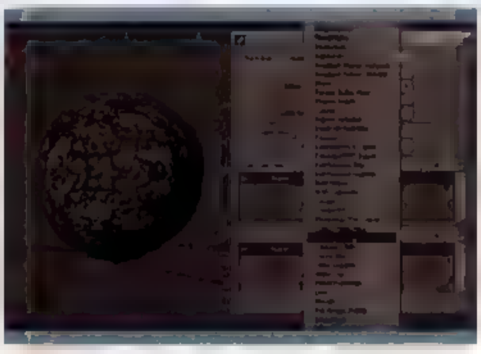


12 You might want two fill lights so some of the light gets underneath the ball. You can also add a rim light behind the ball, giving a rim of light along its edge. You should now adjust the brightness of the various lights so that the ball's lighting looks appropriate for the background plate.

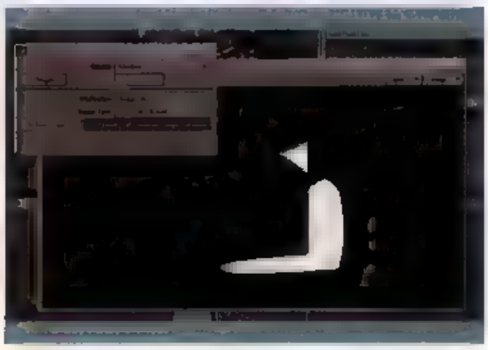
STAGE FIVE | Rendering passes



13 Now you can render a beauty pass of the ball. Set the background to black, turn on Motion Blur in the render panel and deactivate the alleyway (turn off the tick in the Scene Editor). Render out an image sequence of your animation, remembering to use a 32-bit saver (such as LW_TGA32) to save the Alpha channel.

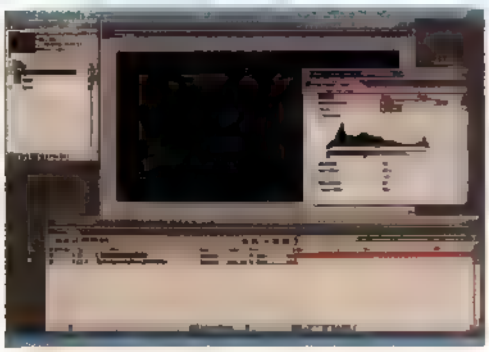


14 To render the shadow pass, turn the alleyway back on, set the ball to Unseen By Camera from the Render tab on its Object Panel and turn off the fill and rim lights, again with their Scene Editor tick. In the Effects panel, add the Render Buffer Export plug-in as an Image Filter and double click it to open its panel.

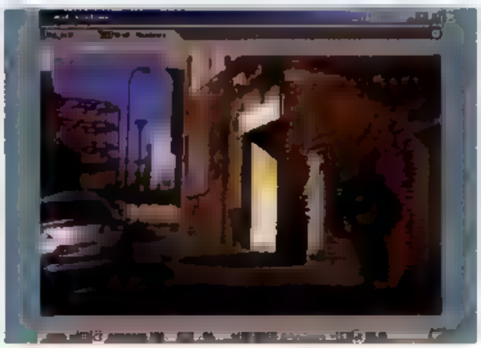


15 Set Source to Shadow and Image Type to TGA24. Set a filename and a destination and then, before you render, turn off the RGB Output in the Render Panel, otherwise *LightWave* will save over the last render. An [F10] render will throw up an error message but ignore it. Check a rendered image to see the white-on-black shadow.

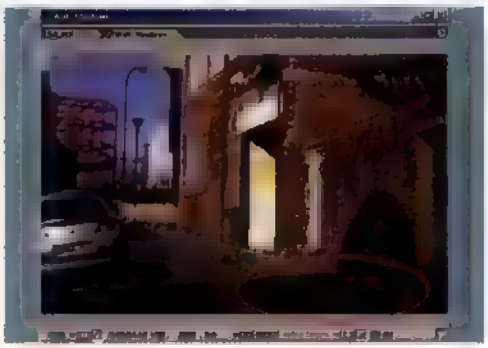
STAGE SIX | Compositing in After Effects



16 Create a new *After Effects* Composition that's 7 seconds long at 720x380, making sure to use Square Pixels and 25 frames per second. Add the Background_Plate image sequence to it, then create an adjustment layer on top of it. Add a Levels effect and tweak the Output White setting to quickly darken the image.

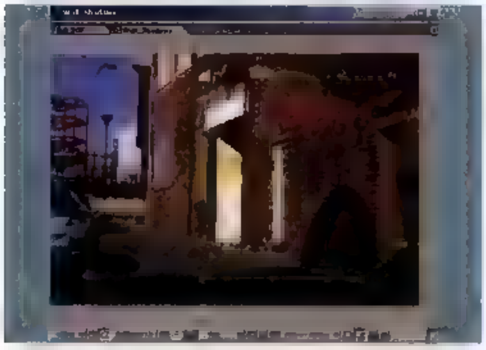


17 You can now use your rendered shadow pass to drive this adjustment, so import the pass above the Adjustment layer and change the TrkMat to use the Luma from the render. Move to 4 seconds on the timeline and you'll see a shadow on the wall and floor. The task now is to make this shadow match the shadows you can already see.

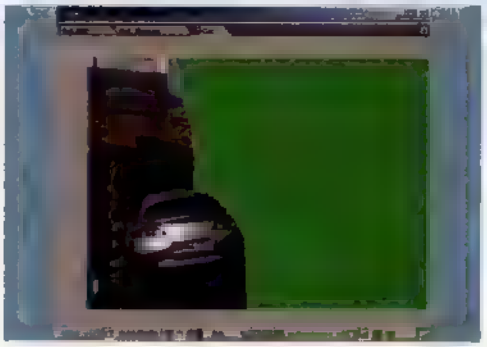


18 Apply a Gaussian Blur effect to Wall_Shadows and set it to about 2 to blur them to match the plate. Now move forwards to 4.5 seconds and you'll see that where the rendered shadow crosses a real shadow, you get doubly dark shadows. You'll have to mask this out, so select the Shadows Layer and activate the Pen tool.

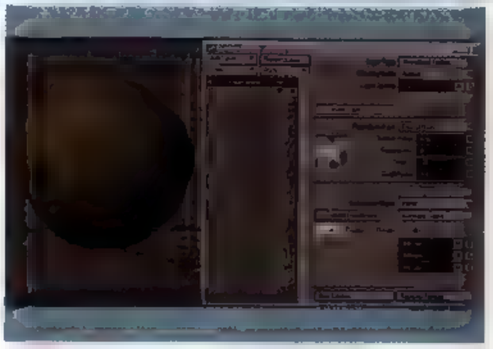
STAGE SEVEN | Adding masks and final touches



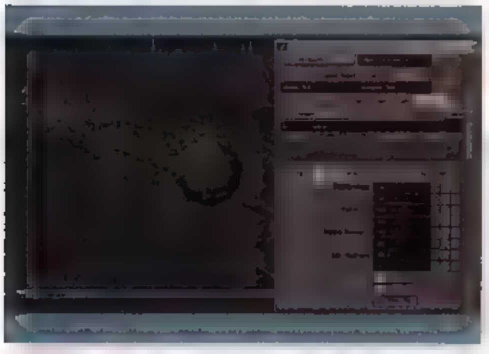
19 Change the Mask mode to Subtract and draw a mask onto the composition to match the area of the big shadow at the bottom right. It doesn't have to be too accurate because it's only visible for a few frames. You can also set Feathering to around 3 to blur it so that it roughly matches the softness of the real shadow.



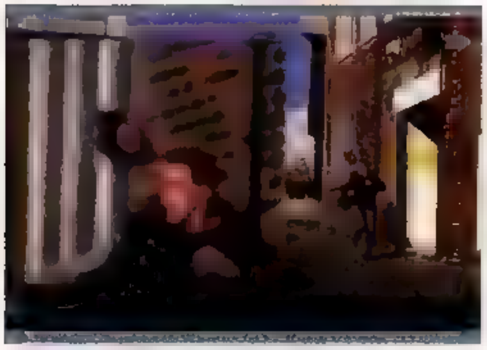
20 Clearly, we're also going to need to mask out the car and foreground wall elements that the ball has to pass behind. Add the background plate to the top of the composition again and use the Pen tool to draw around the car and the wall, using a feathering value of 1 to get a slightly soft edge.



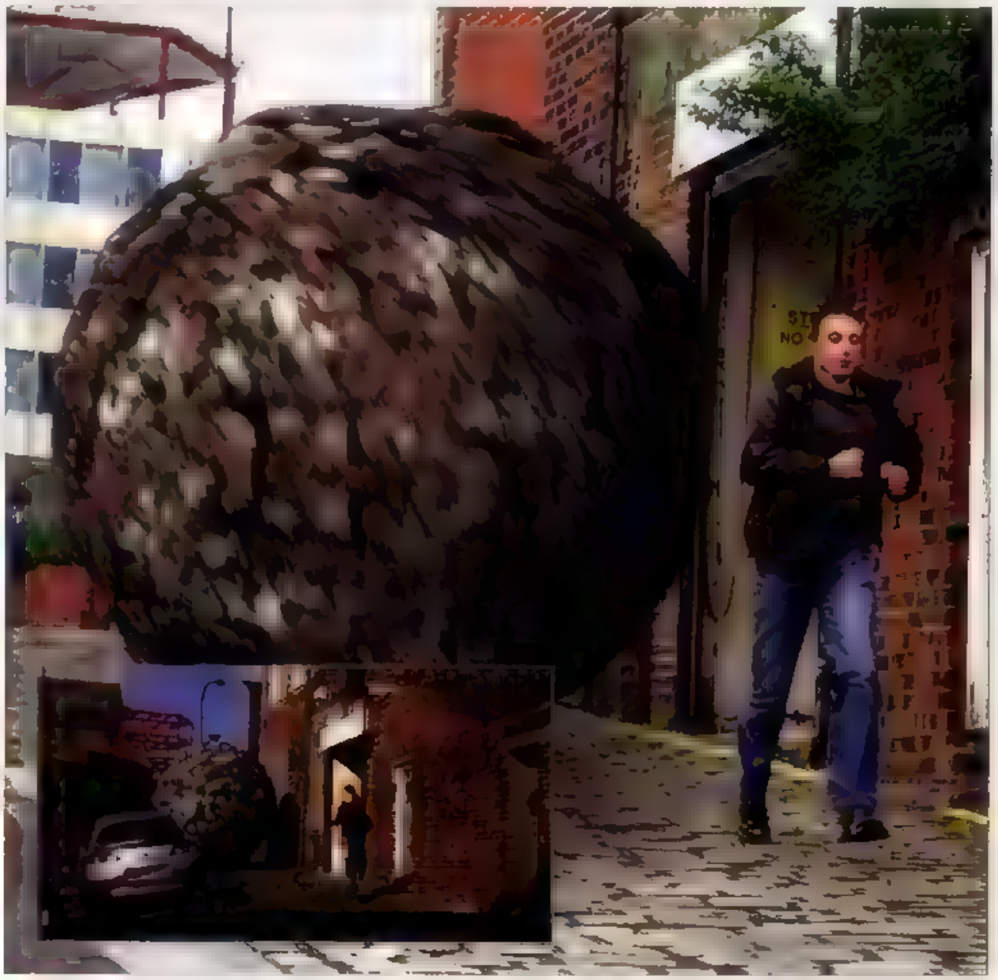
21 We used a displacement map on the rock ball when we rendered the passes on the cover CD, which means it isn't perfectly round. Add one from the Object Properties panel, make it a Fractal Noise procedural and experiment with the settings until you get something that's subtle but also realistic.



22 Add a PFX emitter to the ball object in *LightWave* so that it spawns particles as it rolls along. You can then apply HyperVoxels to the particles and render them in the Sprite mode, with the floor and the ball set to be black. This enables you to create a column of dust that looks like it's being kicked up from the floor by the passing ball.



23 You could even model a little 3D hat in *LightWave* and position it to match the hat once it's on the floor. When the ball passes over, the hat could flip up in the air with the rush of air moving past. To do this, use the Front projection texture to stick the texture from the plate on the hat.



24 In your final *After Effects* composition, you can not only composite in these extras, but you can also considerably tweak the look of what you've got. Experiment with trying to key out the sky in the footage, blur it and re-composite it over the ball so that the blue of the sky seems to lap around the ball slightly. You can also add grain and noise into the ball and ever so slightly into its shadow to get it to match the grain from the DV on the background video better. If you aren't editing the shot among other shots, you can also colour correct or 'grade' the shot to make it look more interesting - perhaps with a desaturated yellow tint to make it look more like an Aztec desert and less like an alleyway in Sheffield. You can find some of these tweaks in the *After Effects* file final_shot_extra.aep on the CD. ●

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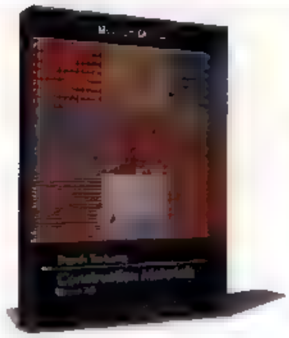
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QUESTION

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b) Emailing

c) Digital video editing and computer-aided design work

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"The one dream feature I'd add to this workstation is..." (Complete in no more than 30 words)

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The PC's ATI PCI-E graphics card is built for high-performance work

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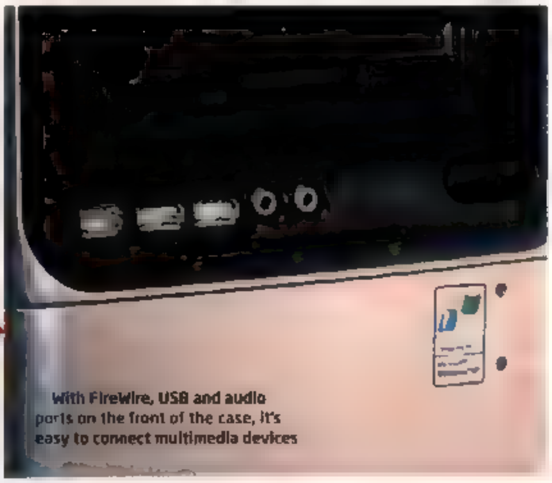

With FireWire, USB and audio ports on the front of the case, it's easy to connect multimedia devices

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the fantastic five

Forget modelling or animation: the real heroes of 3D are the jobs most likely to land you a full-time position. Over the next few pages, we profile five easily overlooked careers that could provide your first big break in the industry. To uncover their identities, read on...

WORDS BY MARK RAMSHAW
ILLUSTRATIONS BY LOÏC ZIMMERMANN

RUNNER

Jacks of all trades, runners do the little things that keep a studio working smoothly, making this a perfect job for new graduates

Andrew Proctor has worked as a runner at Soho studio The Mill for some six months. "What does a runner do?" he muses. "A runner does everything!" Good experience then, for a recent computer animation graduate – a qualification that Proctor had initially hoped would enable him to walk straight into a prestigious job at a studio.

"That's just how everyone at university perceives it," he says. "But then you find out that's not how the industry works. All but the most exceptionally talented have to work up through the ranks."

Proctor is one of a dozen or so runners at the 200 strong company. Some have similar qualifications, others joined without taking a degree beforehand. Personal qualities often win out over academic ones: a runner, Proctor says, is there to keep the clients happy. "Our job is to make sure their day here goes perfectly, ensuring that they get first-class service and that we're the best at what we do. We make sure the suite is in order and get them food, drinks or anything else, no matter how obscure."

FACTFILE

JOB TITLE
Runner

KEY RESPONSIBILITIES
[illegible]

KEY QUALIFICATIONS
[illegible]

JOBS AVAILABLE
300-400

STARTING SALARY
[illegible]

JOB PROSPECTS
[illegible]

EASE OF TRANSFER
[illegible]

PROS
[illegible]

CONS
[illegible]

● Although a runner is often thought of as a glorified teaboy, the job is more technical. "The first project I got to work on was this Weetabix commercial, doing the tracking for four shots," says Andrew Proctor, a runner for The Mill

While making the tea may seem far removed from 3D computer graphics work, a runner has the benefit of access to pretty much any department within a studio, a luxury sometimes not available to other staff members. And with that comes the ability to gain training in any area they desire.

"There's no single career path," says Proctor. "You can end up working as a *flame* artist, an animator or even a producer. It just depends on what you want to learn. I worked with *Maya* for four years at university but didn't really know how to use it at a professional level. Here I can get help from all the staff, get access to the computer systems in my spare time, and then start to get hands on during work hours, helping out on different projects."

He says that a runner will typically work for between six months and a year before getting an interview to migrate to another department. Essentially, performing the job is like being in an informal recruitment and training programme. "The Mill is famous for the promotion rate of its runners. They're really keen for people to get training – it helps the recruits and it benefits the company."

Proctor admits that the hours can be tough. Overnight stints are necessary if the client needs staff on call, and all informal training is done in a runner's own spare time. However, he firmly believes that the payoff is worth it. "You get to learn how the system works and how the industry operates, and it gives you a real opportunity to progress," he says. "I'd definitely say that it's better to become a runner rather than diving straight in at the deep end."

"PEOPLE DON'T NECESSARILY START OUT WANTING TO WORK AS A RUNNER, BUT IT'S AN ACCEPTED WAY OF GETTING ON IN THE INDUSTRY"

ANDREW PROCTOR, RUNNER, THE MILL

● Starting as a runner is an excellent way for a graduate to get high profile projects on their CV. "I even got my name on the credits!" says Andrew Proctor of this TV ad

PRE-VIZ ARTIST

Although little documented, this increasingly popular role provides a springboard into supervising or directorial work

Pre-viz, warns Pixel Liberation Front Lead Artist Christopher Batty, is not currently one of the larger employment sectors in the CG industry. Despite being the best-known dedicated pre-visualisation studio in the world, Pixel Liberation Front still employs just nine people full time, with freelancers hired as the need arises.

"There aren't many other companies like us yet," says Batty, "and pre-viz is a bit of a hit and miss area for larger studios, where they can't always rely on enough work in-house to keep a team busy. But there are some, like ILM, who now run their own departments."

Batty joined PLF in 2001 after a brief time spent working in New York in the architectural visualisation and broadcast fields. "A lot of the core people here came from an architectural and graphic design background, although as the company has grown, others have joined with backgrounds in traditional and computer animation, and even some with a background in sculpture or teaching," he says.

One of the key attractions of pre-viz is the ability to get to the heart of the movie development process, working closely with the heads of each department to map out how the movie will be put together. "With several films, we've started work on them before they even had a completed script," says Batty.

Although pre-viz artists work with 3D packages, the work is far removed from other kinds of 3D animation. "A lot of the time we're working at a fairly crude videogame level of rendering," explains Batty. "It's more about figuring out how the shot is going to work, and working on the timing and editing. The idea is to give the director something that reflects his vision, that he can use as a communication tool, whether that's to get a project greenlit or for working with the camera department, the art department and the vendors handling the effects."

Although pre-viz artists are often required to work on a show from pre-production right up until near the end, Batty says that the hours are fairly regular, with less pressure than is placed on the effects facilities. "Each production has its own challenges, though," he reveals. "If a director is under pressure, that can trickle down, or schedules can change and a shot you expected to be a month away has to be dealt with immediately."

For those determined to seek out work in the small world of pre-viz, Batty stresses that traditional animation skills aren't necessarily applicable, allowing applicants with more traditional cinematic skills to come to the fore. "I know of a couple of productions where people just hired young animators, and not surprisingly didn't get the results they wanted. This is a discipline more closely related to cinematography, directing and editing, and it's that combination that makes it so exciting."

> "IN EFFECT, YOU'RE MAKING A SMALLER VISION OF THE FILM BEFORE THEY DO IT FOR REAL, SO IT'S A GREAT INTRODUCTION TO THE FILM-MAKING PROCESS."
>
> CHRISTOPHER BATTY, LEAD ARTIST, PIXEL LIBERATION FRONT

FACTFILE

JOB TITLE
Pre-viz Artist

KEY RESPONSIBILITIES
Development and visualisation of shot design, setup, timing and editing

KEY QUALIFICATIONS
Cinematography, animation experience

JOBS AVAILABLE
100-150

STARTING SALARY
£15,000-£2[illegible],000

JOB PROSPECTS
Currently modest, but the tiny pre-viz sector looks set to expand in future

EASE OF TRANSFER
Possibility to progress to VFX supervisor or even directorial work

PROS
Introduction to whole film-making process, valuable networking, involvement in creative development of projects

CONS
Lack of control over projects, working on individual projects for extended periods

AD
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● Unlike many careers in 3D [illegible] creative input into the early stages of a movie. I was one of just two artists here working on *The Mask 2*," says PLF's Christopher Batty. "We did pre-viz for the entire film."

RESEARCH & DEVELOPMENT

Adding brains to beauty. It's the developers in the R&D department who come to the rescue when studios need complex effects, commanding corresponding salaries

FACTFILE

JOB TITLE
[illegible]

KEY RESPONSIBILITIES
[illegible]

KEY QUALIFICATIONS
[illegible]

JOBS AVAILABLE
[illegible]

STARTING SALARY
[illegible]

JOB PROSPECTS
[illegible]

EASE OF TRANSFER
[illegible]

PROS
[illegible]

CONS
[illegible]

While there are many fine examples of high-quality CG work created solely with off-the-shelf software, the leading effects facilities and animation studios invariably provide their artistic staff with custom-written tools. For these proprietary solutions, they rely on the scientific expertise of R&D.

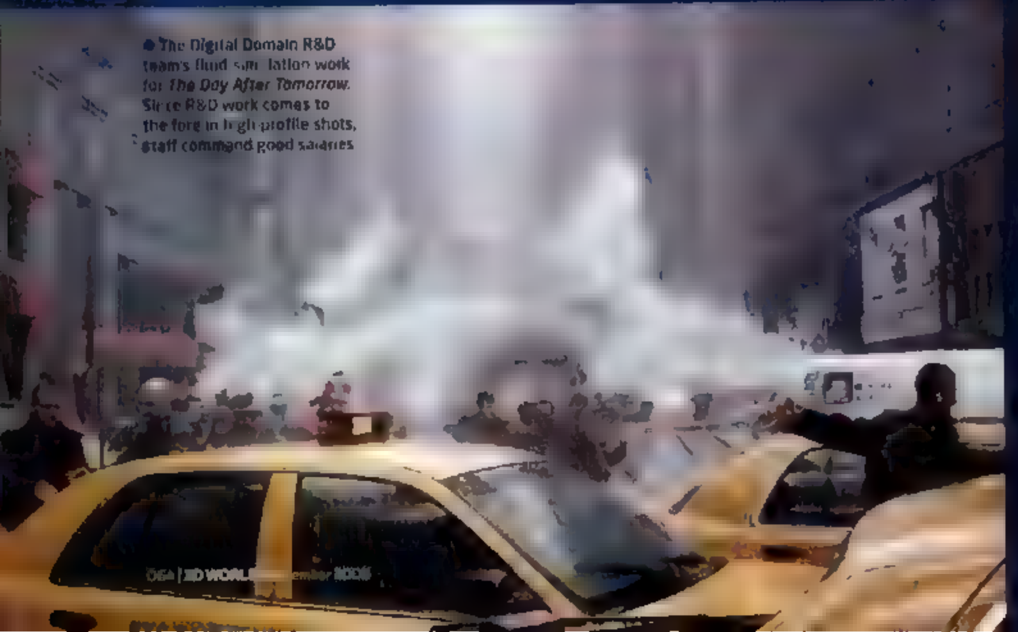
Over at Digital Domain, Doug Roble is Creative Director of Software in the studio's development division. "I get to code and manage projects rather than people," he explains. "Specifically, I'm in charge of fluid system development and computer vision, working with Nafees Bin Zafar and John Flynn respectively. Computer vision involves trying to figure out where things are, how light bounces around and so on. We've got a cool set of tools, including *TRACK*, which won an Academy Technical Achievement Award in 1999."

"There are two distinct areas that are handled by development programmers – tools for artists and tools to help the facility run as smoothly as possible. In effect, the clients are the studio's artists. That means the user base works right alongside you, providing feedback when things work well and when they don't," says Roble. "It's a high-pressure job, but one that offers almost immediate gratification. Artists will often tell you they couldn't have created a shot without your software."

Roble says that a Bachelor's or Master's degree in computer science, engineering or mathematics is a typical requirement for a software developer. Roble himself gained a PhD in Computer Science from the Ohio State University in 1992. Studios like Digital Domain tend to recruit people straight from college, though there is some migration between R&D and technical direction. Roble says that the latter is less common, though he notes that TDs who do move into development tend to possess a valuable artistic bent. "We've also had a couple of developers join from the videogames industry," he adds. "They bring a real desire for efficiency, which is sometimes lacking with some of the more high-falutin' software developers

Roble points out that his is something of a niche area. After all, a development team is a financial burden, and so it requires a studio of a certain size to support it. "Smaller places may have one or two technical directors who know how to code, but often they'll be focusing on shots rather than long-term solutions," he explains.

Software development is also becoming more pressured due to shrinking movie schedules. "We have long-term projects, such as volume rendering tools, which span several movies, but there are also times when a movie drives the technology. With schedules shrinking from two years to 18 months or less, we have to be smarter than ever to anticipate what's required or to control the scale of the challenge. But then we are further removed from the frontline than most. The animators have much crazier hours!"



The Digital Domain R&D team's fluid simulation work for *The Day After Tomorrow*. Since R&D work comes to the fore in high-profile shots, staff command good salaries

> "THERE ISN'T THE SAME MOBILITY AS THE ART SIDE, WHERE PEOPLE CAN JUMP FROM STUDIO TO STUDIO BETWEEN PROJECTS, BUT BEING A SOFTWARE DEVELOPER PAYS WELL"
>
> DOUG ROBLE, CREATIVE DIRECTOR OF SOFTWARE, DIGITAL DOMAIN

TECHNICAL DIRECTOR

In an industry that combines scientific innovation with creative virtuosity, the technical directors provide the all-important link

Programmers toiling away in the research and development departments fall neatly into their own scientific camp, while the majority of other jobs in the industry are generally more closely linked to the creative side of the production pipeline. However, the role of the technical director is a little less easy to pigeonhole.

"A technical director acts as a bridge between the scientific and the artistic," explains Chris Lawrence at Framestore CFC. "Within the area of technical direction there's then a fair degree of variation, with some people more inclined towards the R&D work, and others more towards the artistic side, dealing with elements like lighting."

Lawrence joined the studio four years ago after graduating from university with a degree in Engineering and Computer Science. While on that course he took an internship with Hewlett Packard that further sparked his interest in the creative side of the industry. "Working with them out in Palo Alto, I got to see a lot of interesting work using image based modelling, high-spec digital cameras and lots of blue sky stuff," he says. "A few other technical directors here have a similar engineering background, and some studied computer science, although the majority went through the usual Bournemouth [University] animation route."

His first job at the studio was in the systems department, where he spent a year taking time to learn *Maya* better, before switching to technical direction. A more common path, he says, is for people to start out as render wranglers or motion trackers. Technical directors can eventually go on to become CG supervisors, although with salaries ranging from £20,000 to somewhere around £80,000, there's obviously a lot of room in which to manoeuvre within the TD department itself.

Lawrence explains that a technical director's role keeps them working throughout the production schedule. "When the company takes a project on, there's a period of R&D where the TDs will concentrate on look development, while simultaneously working to overcome any technical hurdles, and providing the artists with a system that's intuitive enough for them to do their work efficiently."

Whereas R&D programmers usually code using a programming language such as C++, technical directors will typically write the plug-ins and scripts for applications. And while an R&D department remains focused on software development and problem solving, the role of the technical director shifts once live plates start to be handed out to an effects facility.

"Then our work involves making the shots look as good as possible," says Lawrence. "We deal with pretty much anything that's not handled by the animation teams, such as particles, setting up dynamics, creating secondary or tertiary animation systems, and working on lighting."

Although technical directors are plugged into a show from start to finish, Lawrence says that they tend to work a regular week. "There's always some crunch time, but I certainly haven't had to work that much overtime in the last couple of years. We're more exposed to schedules than animators, but certainly less than the compositing department."

"TDs HAVE A FAIRLY SYMBIOTIC RELATIONSHIP WITH THE R&D PEOPLE. R&D MIGHT DEVELOP A WATER SIMULATION. THE TECHNICAL DIRECTORS WILL THEN MAKE SURE IT'S USABLE"

CHRIS LAWRENCE, TECHNICAL DIRECTOR, FRAMESTORE CFC

FACTFILE

JOB TITLE
[illegible]

KEY RESPONSIBILITIES
[illegible]

KEY QUALIFICATIONS
[illegible]

JOBS AVAILABLE
300-400

STARTING SALARY
£20,000

[illegible]
[illegible]

EASE OF TRANSFER
[illegible]

PROS
[illegible]

CONS
[illegible]

TDs bridge the worlds of art and science: "On *Troy*, I was involved with the rendering setup for this armada sequence, working out how to manage its *Maya* and *RenderMan*," says Framestore CFC's Chris Lawrence

MATCHMOVE ARTIST

As digital effects, characters and set extensions become ever more complex, the job of the matchmover, who meshes them into live footage, becomes more highly prized

Live action doesn't combine with CG all by itself, you know. It's the problem solving skills and unflinching eye for detail that are provided by the matchmove artists that ultimately enables animators, lighters and compositors to fuse the two disparate elements together.

Lisa Gonzalez is a matchmove artist at the Moving Picture Company having joined after gaining a Bachelor's degree in Computer Animation and Visualisation at the UK's prestigious Bournemouth University. "The key responsibilities of a matchmove artist at MPC involve reproducing live action camera moves within a 3D environment using a 3D camera solve, constructing 3D scene geometry, and 3D rotoscoping of characters and objects to match the live action," she explains. "We liaise and supply matchmove elements to all areas of the VFX pipeline, from lighting and animation to 2D roto and compositing."

There are currently 20 artists in MPC's matchmove division, with the matchmove co-ordinator moving team members from one project in the film department to another as the need arises, rather than assigning them for the duration of one show. In addition to standard tools such as *boujou*, *3D-Equalizer*, *Maya* Live, and *Shake*, Gonzalez also works with MPC's own proprietary matchmoving tools.

FACTFILE

JOB TITLE
[illegible]

KEY RESPONSIBILITIES
[illegible]

KEY QUALIFICATIONS
[illegible]

JOBS AVAILABLE
[illegible]

STARTING SALARY
[illegible]

JOB PROSPECTS
[illegible]

EASE OF TRANSFER
[illegible]

PROS
[illegible]

CONS
[illegible]

"A relevant degree in 3D graphics, photography or a similar art-based or computer subject helps to prepare you for the job," she says, "but there is still a need for a training period when you start, because in general, previous employment and education don't train you specifically for matchmoving."

Matchmove artists generally work on a freelance basis, with starting salaries ranging from £14,000 upwards, depending on experience and ability. Many graduates, as well as the studios, consider matchmoving to be an entry-level position. MPC instead emphasises matchmoving as a career in itself, stressing the need for more experienced matchmovers as standards rise and the job becomes ever more complex. "Matchmoving is a highly skilled and demanding area of 3D, providing an essential service for the rest of the 3D team, and it should be regarded as such," says Gonzalez.

She also points out that matchmoving is not necessarily the first stepping stone for graduates. "People have joined our department from other areas of post production, such as 2D rotoscoping, motion capture, animation and lighting."

With regard to working hours, matchmove artists tend to work a typical week, though there are the inevitable crunch periods. "Crunch times for matchmovers tend to be earlier in the duration of a show's production because we're the first stage in the 3D pipeline. However, we're also on call at the end of the show to deal with the last minute matchmove requirements that tend to arise," says Gonzalez.

Of all the roles covered in this feature, matchmove artists are perhaps the ultimate unsung heroes. Few outside of the industry ever really understand what they bring to a show, or even that there's a need for matchmoving at all. And even those in the know are prone to forget about their contribution. As Gonzalez says, "Our work is an unseen art." ■

"MATCHMOVE ARTISTS PROVIDE THE UNIQUE SKILLS THAT ALLOW THE REST OF THE 3D PIPELINE TO DO THEIR JOBS SO COMPETENTLY"
LISA GONZALEZ, MATCHMOVE ARTIST, MOVING PICTURE COMPANY

● Once an entry-level position, matchmoving is fast becoming a career in itself, thanks to the complexity of projects like MPC's shots on *Batman Begins*

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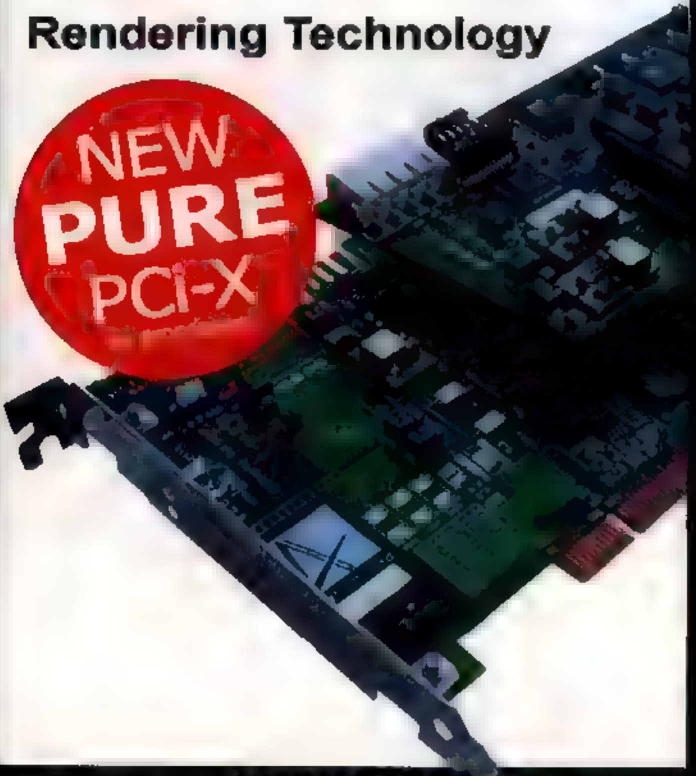

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Q&A

SOLUTIONS/FIXES/ADVICE

● In reality, a car – even a toy car – does not simply move forwards: it also rocks up and down on its suspension as it travels over bumps in the road. In *XSI*, a simple primitive rig can be used to simulate this motion

QUESTION OF THE MONTH
Submitted by David Burns, via email

SOFTIMAGE|XSI

"How do you set up a model car for realistic animation?"

FACTFILE

FOR
Softimage XSI

DIFFICULTY
Elementary to intermediate

TIME TAKEN
One hour

ON THE CD
- Full-size screenshots
- Start and finished XSI scene files

ALSO REQUIRED
N/A

This issue's answer is supplied by Ola Madsen, who works as 3D artist for Digital Context in Sweden, animating everything from medical treatments to children's toys

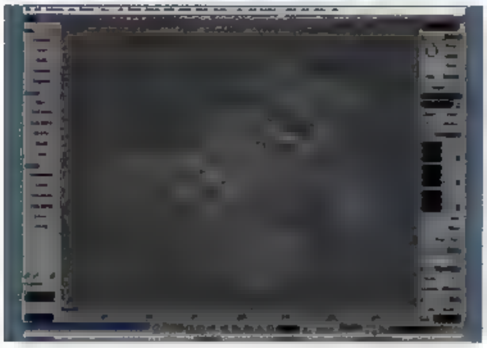
"Beneath the technical wizardry, the way in which a car works is fundamentally very simple. Energy generated by the engine is transferred to the wheels, which in turn, forces them to rotate. Due to the friction between the tyres and the ground, this rotation then drives the entire car forwards.

However, when rigging a model of a car for animation, 3D artists traditionally approach the problem the other way around. It would be far too complicated to derive the motion of the entire car from the rotation of the wheels; instead, hierarchies and/or constraints are used for the overall motion, while expressions are used to make the wheels rotate accordingly. But while this approach gets the job done, it isn't particularly intuitive. If the road surface is anything but perfectly flat, the components of the car fail to react to this vertical motion, adding metaphorical as well as literal bumps to the workflow. But instead of going through the lengthy process of animating these different parts manually, we can make use of XSI's dynamics engine. By adding Rigid Body Dynamics (RBD) to the animation rig, we can recreate the same essential behaviour as a real car.

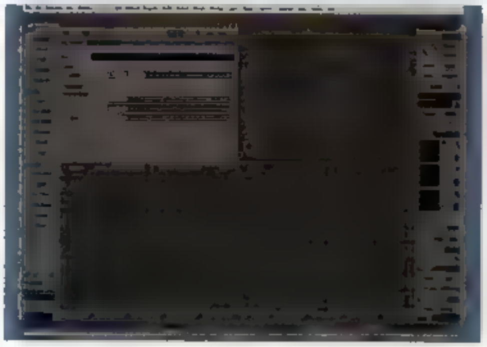
MAKING MOTORS

In this tutorial, we'll be illustrating this technique on the toy car above. Working with simplified geometry enables you to interact intuitively with the components of the scene without losing the accuracy of the simulation, so we'll be using an animation rig made up of simple primitives to simulate the workings of its suspension. Creating a separate primitive rig eliminates any uncalled-for calculation and enables you to adjust elements such as the body or wheels later in production, more or less on the fly. In this way, one underlying rig can be used for many different cars."

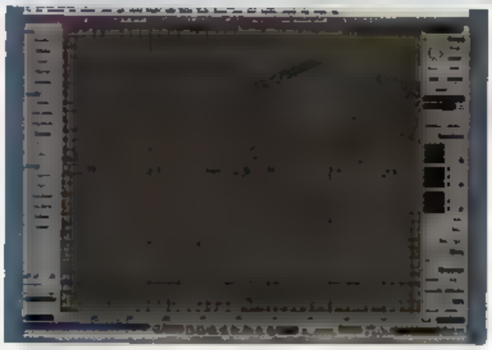
STAGE ONE | Creating the basic rig



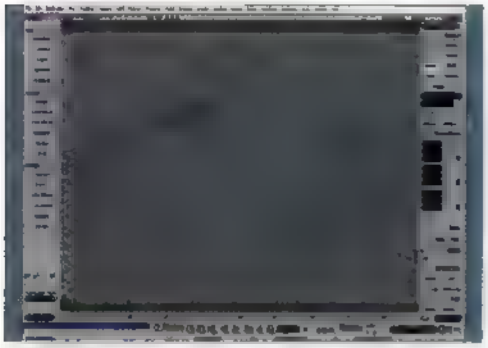
01 If you don't have a virtual car of your own, start by opening car.scn from this issue's CD. While the scene may appear to be empty at first, opening an Explorer view shows that it contains all the essential components of a toy car, although they're currently hidden. We'll get to these later in the tutorial, so just leave them as they are for now.



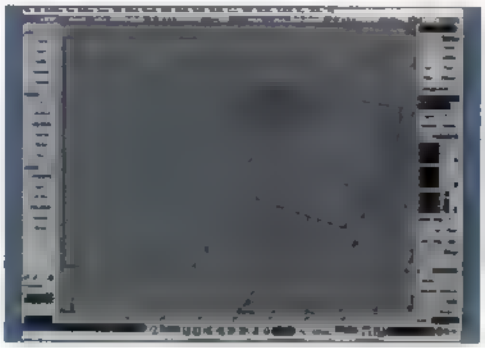
02 The first component to create for the rig is the chassis or the stand-in for the body. As the exact shape of this object will be irrelevant to the eventual animation, there's no reason to use anything fancier than standard primitives. So, from the Get > Primitive > Polygon Mesh menu, choose Cube, leave the Length set to 8 and name it 'rig_chassis'.



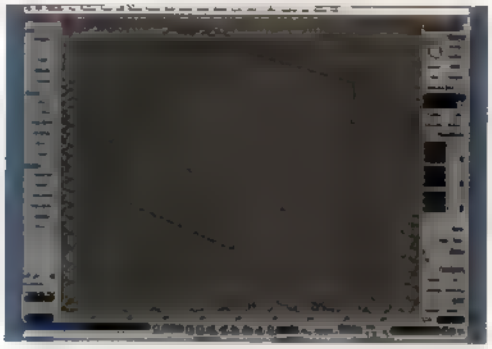
03 While the shape of the chassis might be accurate enough, we still want its overall width and length to match up with the high-resolution version of the car. Scale the cube down to 0.5 on the Y axis and up to 1.7 on the Z axis. Translate the cube upwards about 4 units along the Y axis so the chassis is slightly above the supposed ground plane.



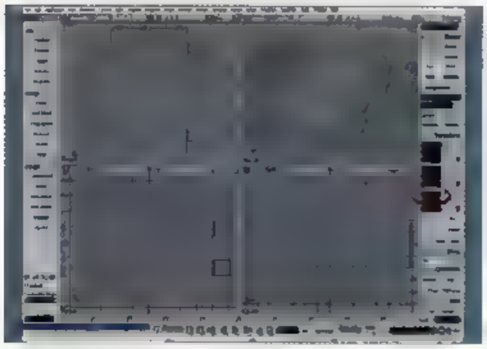
04 Although we've simplified the structure of the car quite drastically, there's really no reason for the driving experience to become unpleasant as a result. So with your driver's comfort in mind, we're going to add suspension to the car. In order for this to function properly, we'll need to create two new objects for each wheel.



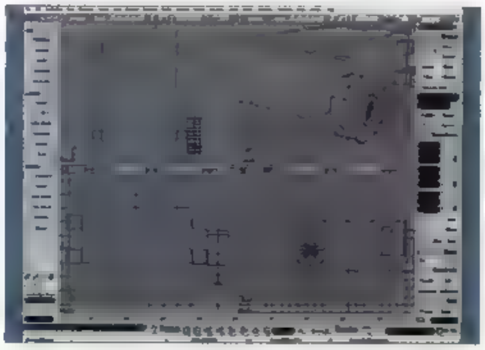
05 As these objects will be used merely to simulate the suspension effect for the wheels, their actual shape and size really won't matter. So from the Primitive > Polygon Mesh menu, create a new Cube and set the Length to 1. In the Top viewport, position the Cube just to the right of the chassis and roughly where the wheels are intended to sit on the Z axis.



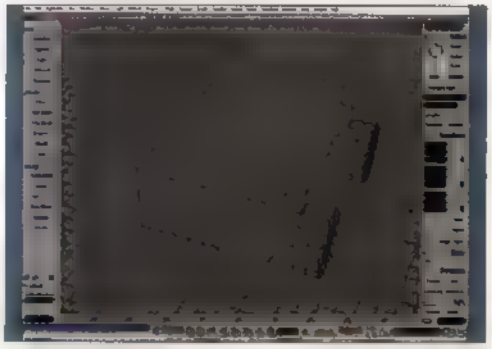
06 Next, in the Right viewport, move the Cube upwards so it's slightly below the top of the chassis. With the cube still selected, press [Ctrl]+[Alt]+[D] to create a duplicate and translate it downwards so it aligns with the bottom of the chassis object. The added [Alt] key in the shortcut ensures that the new copy stays at the same position as its original, as opposed to just using [Ctrl]+[D].



07 Select both suspension cubes, press [Ctrl]+[Alt]+[D] again and move the duplicates back along the Z axis to the rear of the car chassis (where the wheels will be positioned). Next, select all four cubes and duplicate them. Now, simply add a minus in front of the value in the X axis transformation box (the SRT Text Box in the Transform panel) to reposition them on the opposite side of the car.



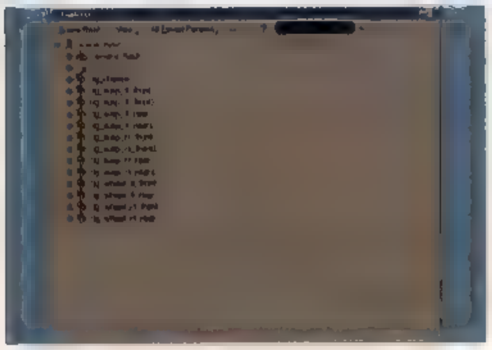
08 From the Primitive > Polygon Mesh menu, create a Cylinder and set the Radius to 2 and the Height to 1.5. While the level of subdivision won't make any difference to the accuracy of the simulation (since we won't be using the actual geometry for the calculation), it will give a better visual appearance. So, increase the U Subdivisions to 15 or so and name it 'rig_wheel'.



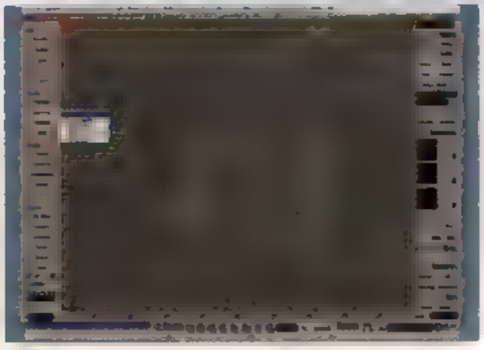
09 Rotate the wheel 90 degrees along the Z axis and align it to any of the lower suspension cubes. Next, create three duplicates and align one at each of the remaining suspension cubes. Go over the scene and make sure none of the objects are interpenetrating, as this will create very unpredictable results if we're to simulate collisions for them.

▶

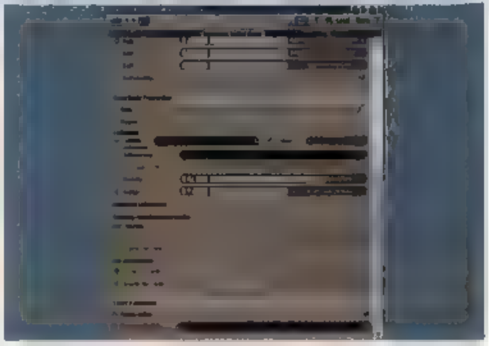
STAGE TWO | Activating RBD for the rig



10 It's important to recognise some of the differences involved when animating with RBD compared to a more traditional line of attack. When using RBD, all the objects are being calculated in global space rather than local. As a result, all objects in the rig should be located directly under the scene root (or at least on the same level) and not be relying on standard hierarchies or joint relations.

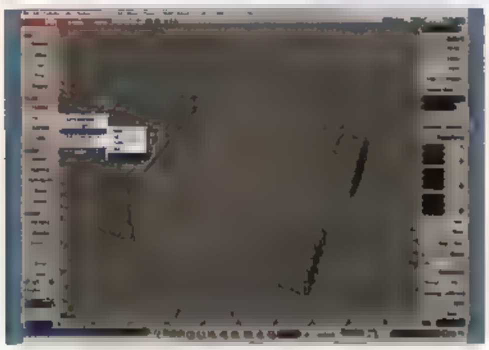


11 With the components of our rig completed, it's time to start adding their respective RBD properties. So, press [4] to switch to the Simulate panel. The first thing we'll need to do is to turn all the objects into active rigid body objects. To do so, select all the objects (there should be 13 in total) and from the Simulate > Create > Rigid Body menu choose Active Rigid Body.

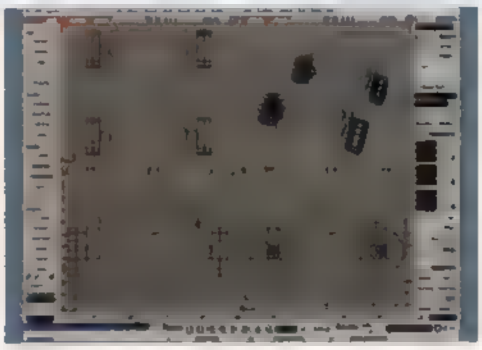


12 As you won't be using any actual collisions on our objects (apart from our wheels, which we'll come to in a moment) you may as well turn off their activeness. So in the Rigid Body Properties Editor, change the Collision Activeness to Muted and make sure the Collision type is set to Bounding Box. You can leave the other parameters as they are, for now.

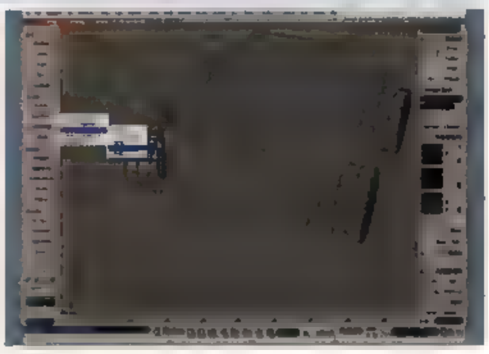
STAGE THREE | Rigid Constraints



13 To stick the different bits and pieces together we'll need to use Rigid Constraints rather than one of the usual Constraints. Since all the objects in the rig naturally should stick together in the end, we'll need to use three different types of constraints in order for the components to work in the preferred manner.

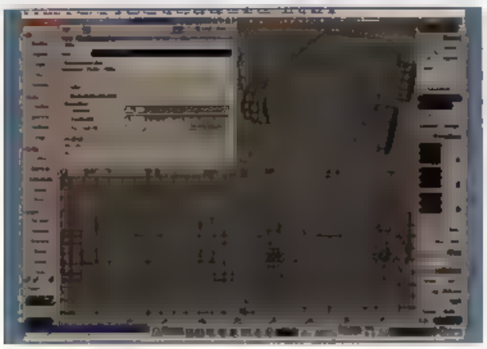


14 The only parts we really want to stick to the chassis are the upper suspension cubes. Start by selecting one of them and from the Create > Rigid Body > Rigid Constraint menu, choose Fixed. Pick the chassis object and leave the parameters in the PPG as they are. Repeat for the other three upper suspension cubes.

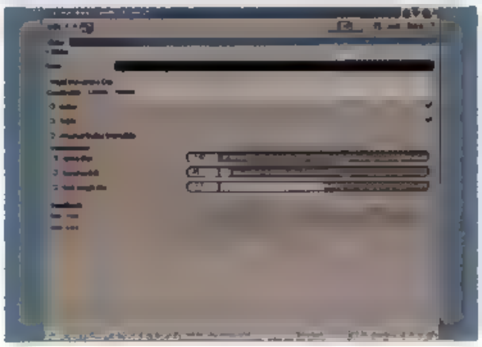


15 To create the suspension effect, select one of the upper suspension cubes and from the Create > Rigid Body > Rigid Constraint menu and choose Slider. Pick the lower cube related to the one you've got selected. We'll edit the parameters for all the sliders at once, so leave them for now. Repeat for the three remaining pairs of cubes.

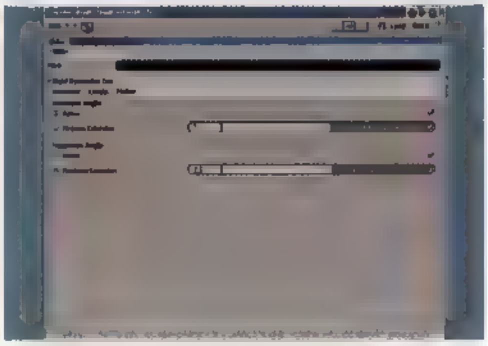
STAGE FOUR | Creating the suspension



16 Select all four Slider Constraint objects and press [Enter] to display their PPG. The Spring (Kp) parameter determines how fast each linkage will contract. However, we want the very opposite effect to take place, so to make it expand instead we'll need to use negative values. Enter about -150 as the Spring (Kp).

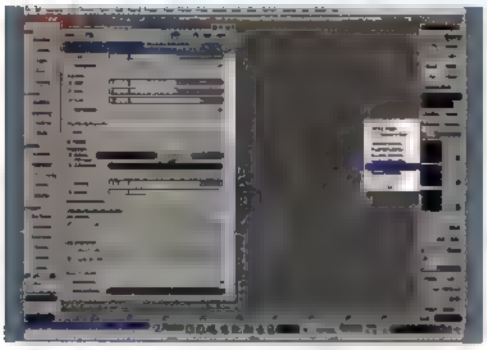


17 The default dampening effect is a bit too low, so increase the Dampening (Kd) to about 40. The Rest Length (R) is the Sliders' preferred length and should be set to about -2.5. Which values to use for the different parameters is really a matter of taste, so ultimately you should tweak them until they suit your specific needs.

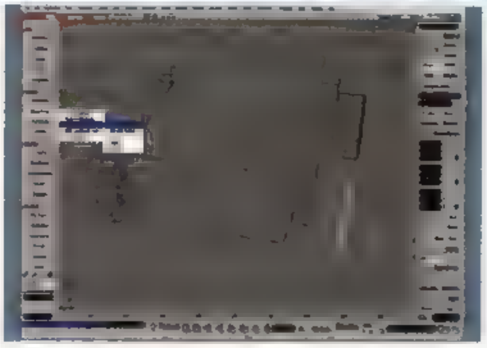


18 Next, we'll need to limit the minimum and maximum length of each Slider, so switch to the Limits tab. The Minimum Extension determines the minimum length the Slider is allowed to reach during the simulation, whereas Maximum Extension sets the maximum. Activate both and set the Minimum to 1 and the Maximum to 2.5.

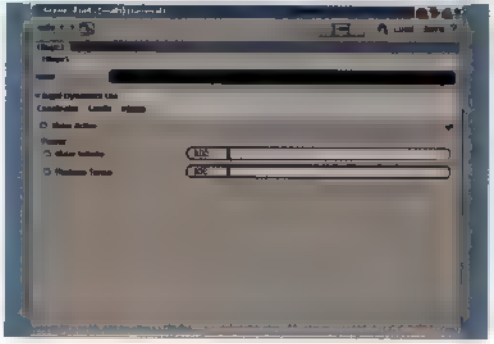
STAGE FIVE | Setting up the wheels



19 Select all four wheels, right click on the Selection button in the Selection panel and choose Simulation Properties. Select the Rigid Body Properties in the PPG and change the Collision Activeness to Active. As the wheels are round, we also need to change the Collision type to Bounding Sphere. And finally, increase the Friction to 1.

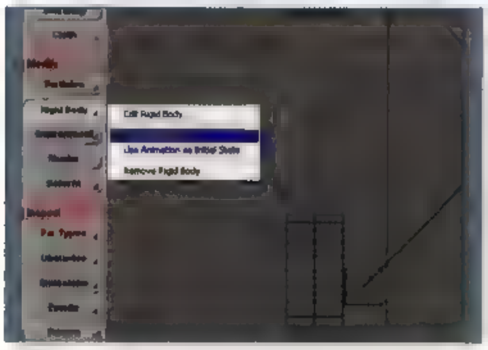


20 Select one of the wheel objects again and from the Create > Rigid Body > Rigid Constraint menu, choose Hinge and pick the corresponding lower suspension cube. The Hinge Constraint limits the movement of the wheel to revolving around a preferred axis, which is just what we're looking for. Repeat for the other three wheels.

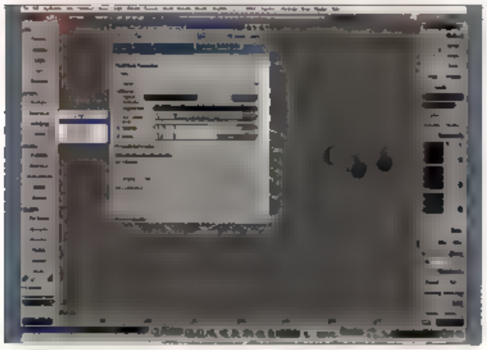


21 Select the two rear Hinge Constraint objects and press [Enter] to display their PPG. Switch to the Motor tab and click the Motor Active checkbox. The Maximum Velocity determines the rate of the rotation, whereas the Torque determines the maximum amount of force to be transferred. Set both the Velocity and the Torque to around 800 or so.

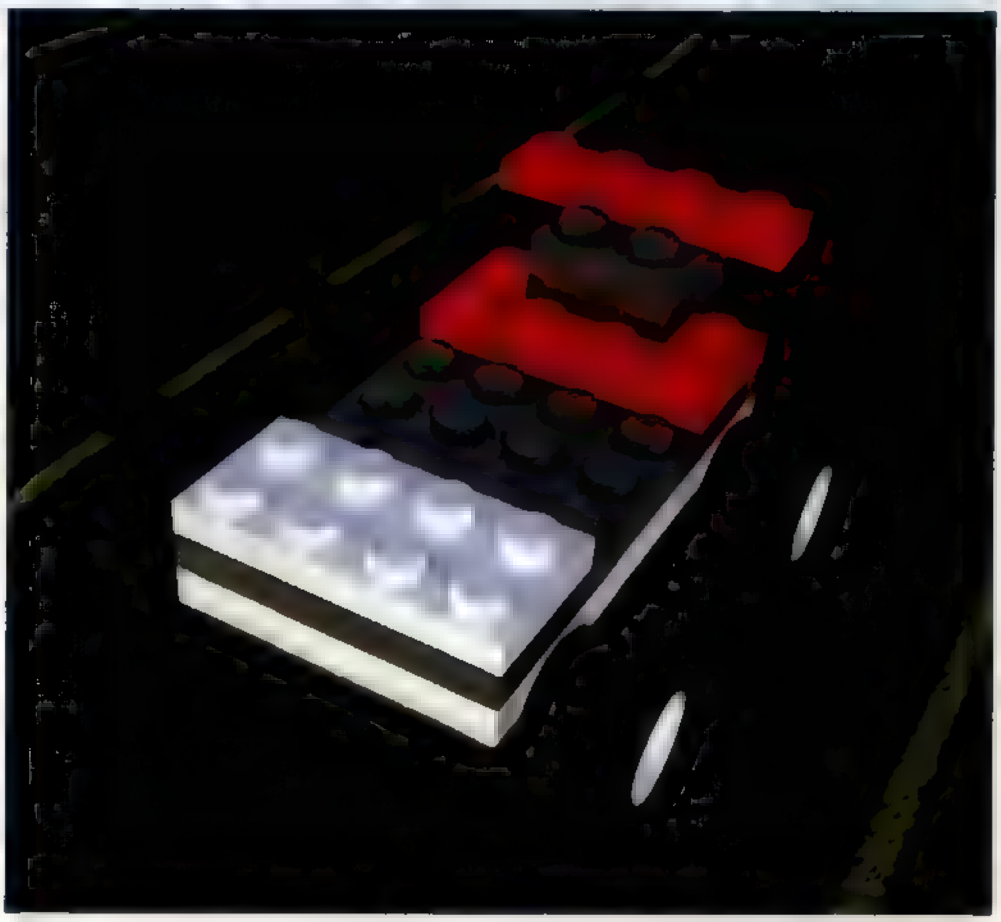
STAGE SIX | The road ahead



22 If at any time you need to reposition or reorient any of the car rig's components, it's vital that you remember to update their initial state. If you miss this step, they'll simply return to their previous initial state as soon as you run the simulation. To set their new state, select all the objects and from the Modify > Rigid Body menu, choose Set Initial State.



23 Press [8] to open the Scene Explorer, select the ground object and press [H] to unhide it. We don't want this object to be affected by any forces in the scene, but we do want it to be included in the simulation. From the Create > Rigid Body menu, choose Passive Rigid Body. In the PPG, change the Collision type to Actual Shape as we want the car to follow the actual shape of the ground.



24 The last thing we need to do is to add an actual force to the scene, so from the Get > Force menu, choose Gravity and you're done. To get a more accurate result, click the Explore button in the Select panel and choose Environments. Expand the tree Environment > Operators and pick the Dynamics Operator. In the PPG, change the Sub steps under Simulation Accuracy to about 10.

Now unhide the high resolution version of the car body and the wheel (of which you obviously will need another three duplicates) and use a standard Constrain > Pose to constrain them to their respective counterpart in the RBD rig. Note that you should use cnscomp (constraint compensation) for the body, due to the scaling of the chassis. Your toy car is now rigged and ready for animation. ●

Forum | Post your XSI queries at http://forum.3dworldmag.com

Q&A

Our experts this month...

3DS MAX

Pete Draper has actually met Alan Titchmarsh, he's never felt the urge to lay decking or erect a water feature..
www.xenomorphic.co.uk

CARRARA 4 PRO

Mike de la Flor is a medical illustrator, instructor and teaches computer graphics at Kingwood College. He also wrote *The Carrara Studio 3 Handbook*
www.delaflor.com

CHARACTER STUDIO

Chris Ollis works at Codemasters and in his spare time writes for *3D World* magazine. He's probably having a very bad day
www.InterTwined.co.uk

CINEMA 4D

Adam Watkins is a professor of animation at the University of the Incarnate Word in San Antonio, Texas
www.cgauiw.com

LIGHTWAVE

Benjamin Smith is creative director of Red Star, a visual effects facility based in the north of England. He hates flossing
www.redstarstudio.co.uk

MAYA

Gary Noden still works for 422 Manchester. Recently he has been seeing double, and not just in his workload..
www.422manchester.co.uk

PHOTOSHOP

Leigh van der Byl is a 3D artist who works for CafeFX in California. Her recent credits include *Sin City* and *Fantastic Four*
http://leigh.cgcommunity.com

POSER

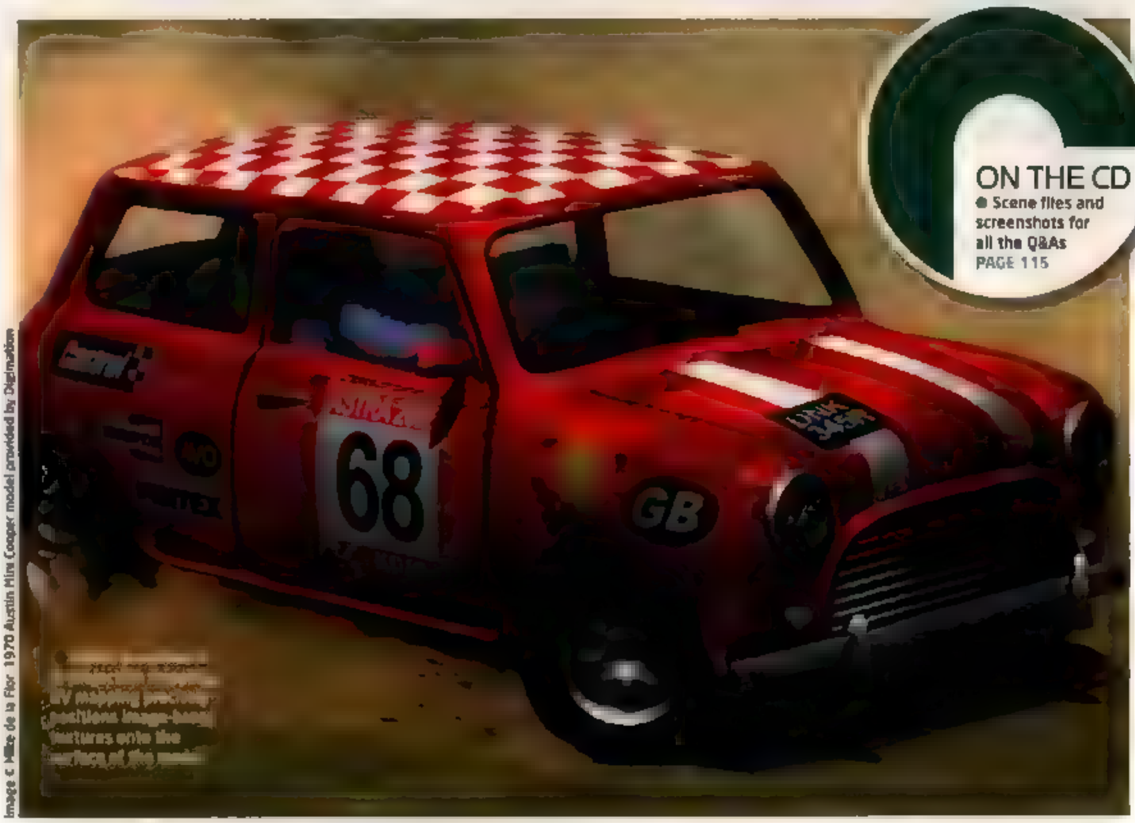
Ian and Dominik Higgins run Pixel Revolution Films, a low-budget film production company based in the UK
www.soupstudio.com

SILO

Glen Southern is a freelance artist/sculptor specialising in *ZBrush* and *LightWave*. He is currently part of the *Silo* beta team
www.southerngfx.co.uk

Quick Questions

No matter which 3D software package you use, our experts are here to help. Send us your query and we'll provide the solution: **http://forum.3dworldmag.com**



UV mapping precisely positions image-based textures onto the surface of the model

Image © Mike de la Flor 1970 Austin Mini Cooper model provided by Digimation

ON THE CD
- Scene files and screenshots for all the Q&As
PAGE 115

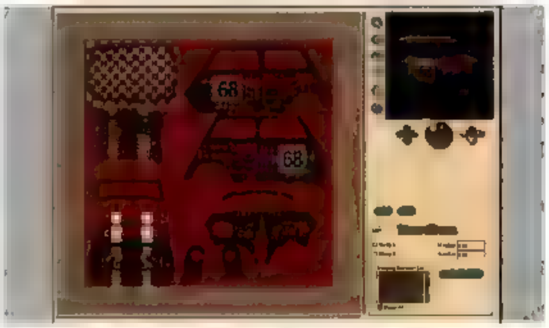
CARRARA 4 PRO | Mapping with the UV Editor

Q **"How can I use *Carrara's* UV Editor to add a paint job and weather to my Mini Cooper model?"**
SIMON BARNSLEY, VIA CARRARA FORUMS

A As with any UV application, *Carrara's* UV Editor assigns UV coordinates to a model so that an image-based texture may be applied precisely. The task of creating the texture itself, in this case a paint job for a car model, is accomplished with a graphics program.

Carrara's UV Editor resides inside the Vertex Modeler (VM) so anything to be UV mapped must be converted to a polygonal model. Once the model is in the VM, shading domains are created to organise the parts of the car. For instance, select the polygons of the bonnet and, in the Properties tray, click on Global tab, locate the Shading Domains Management section and click on the Add button. When prompted whether you want to create a Shading Domain from the selected polys, click Yes and name the shading domain 'bonnet'. Create shading domains for all parts that will be UV mapped, such as doors, boot, roof and so on.

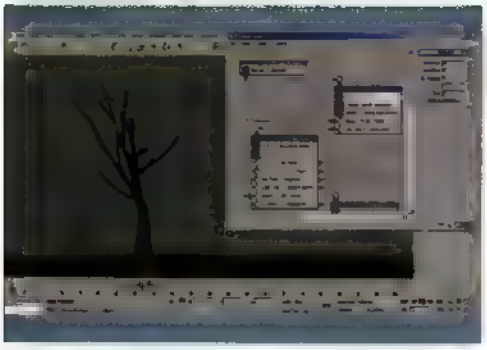
With the shading domains created, select the model and open the UV Editor. If this is a new model, the UV Editor will be blank. But if the model already has UV coordinates, they may appear in the UV map. To clear, uncheck the Show All option in the Shading Domain List, then select one of the shading domains and apply a UV projection method such as planar, spherical or box from the Projection tab. The UV Editor will let you apply different projection methods to different parts of the model and move, scale and rotate grouped or individual UVs. The goal is to arrange the UVs to eliminate distortion. Once complete, export the UV map as an image for texture painting via the Export button in the Display tab. To apply, select the UV mapped polymesh and go to the Texture room. Click on the Color channel in the shader tree, select Texture and browse to the texture file. UV mapping is a process that requires patience so be prepared to do a bit of experimenting. **[MDLF]**



● *Carrara 4 Standard* and *Pro* feature a comprehensive UV mapping toolset that's easy to use. But, as with any application, organisation and planning are required for successful work

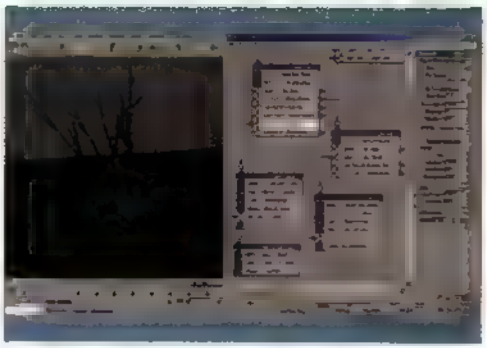
3DS MAX | How can I simulate a growing plant?

NICK PERRIN, VIA EMAIL



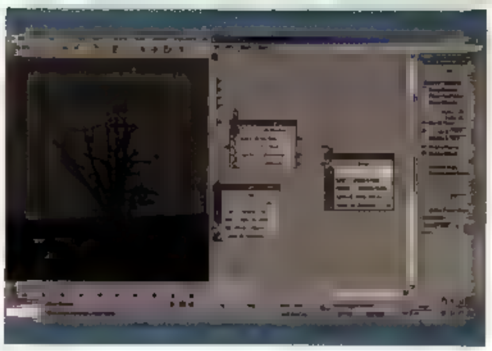
01 We plant the seed...

Load the scene on the CD for reference. The plant's main stem is drawn out for 10+/-5 frames to get it off the ground. A particle is spawned every time it travels X distance; these are passed to an event with shape properties, no velocity, and an animated scale. The main drawing particle is passed to another event where its motion is affected by two Wind Space Warps. After some time, this spawns another with reduced inherited speed and scale to produce a branch.



02 Nature grows the seed...

The particles are tested for scale and age to ensure branches aren't too thin. Due to the Wind's turbulent nature, they're also checked to make sure they don't pass below the ground. All drawing particles spawn trailing particles as before using a simple referenced GeoSphere object with animated scale to get the stems to expand as they age. These drawn stem particles are then passed to another event to prevent them from scaling up any further.



03 And then, we eat the seed

Finally, a leaf particle (referenced from scene geometry and its corresponding material) is drawn out at the end of each branch, which has an animated scale to suggest that the leaf is growing. The particle speed is set to 0 to prevent the particles from moving and rotation is set to random horizontal. For more detailed information about the technique shown here, see the comments in the accompanying scene file's Particle View events. [PD]

CHARACTER STUDIO | Getting the hang of extra IK

Q **"I'm having trouble getting a character's hand to follow a moving object. Any tips?"**

ANDRIA WARREN, VIA EMAIL

Far and away the easiest way to animate a hand following an object is to get the object to do the work for you. By setting the object up as an extra IK Link, you can get flawless contact and automated motion without disrupting the existing hierarchy of your character.

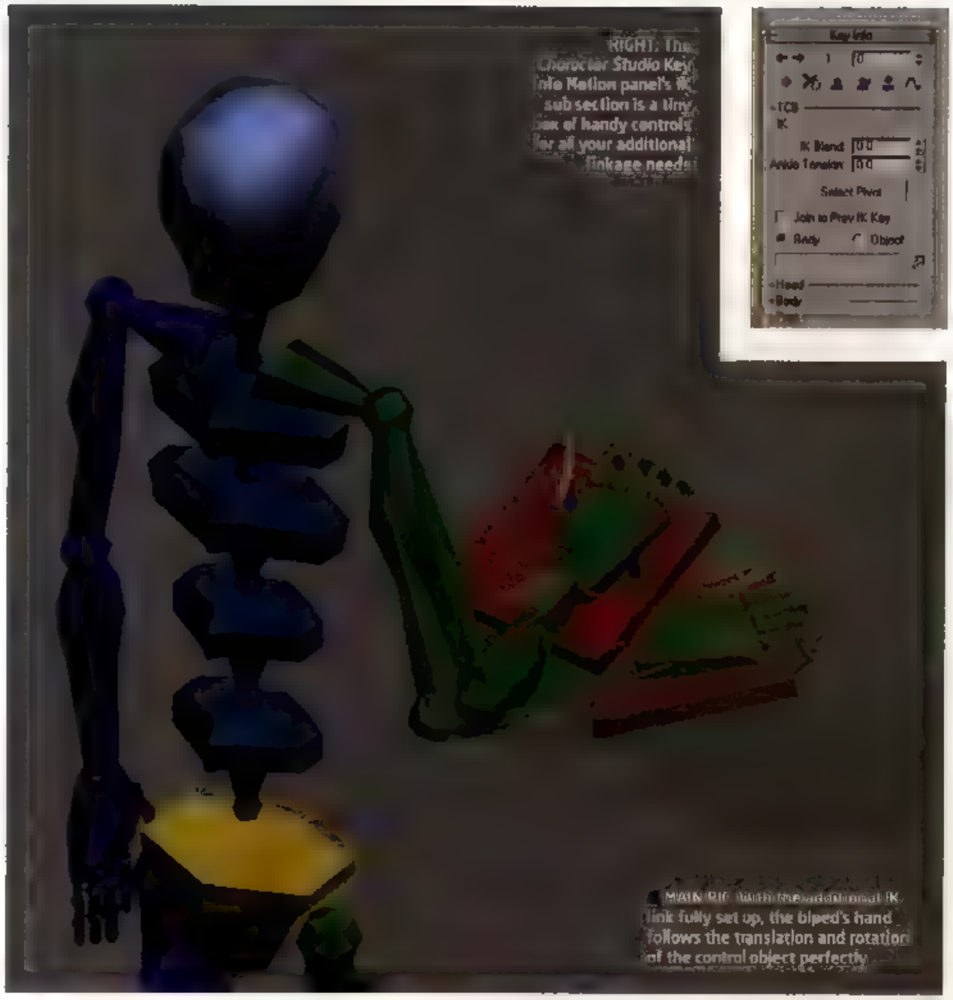
To help me demonstrate this, I've included an example file on this issue's CD (you can find the CD on page 115). It contains a standard *Character Studio* biped that has its right hand positioned over a red block. If you scrub the timeline you'll see that the block moves but the hand remains still. If you were to try and simply keyframe the hand's position to match the block's movement, you would end up with a lot of drifting motion between the key points, which is a bit fiddly and doesn't look good. But by making the block an extra IK linkage of the body, it means it'll become as connected to the hand as the upper arm is to the forearm.

IT'S EASY – JUST GET THE OBJECT TO DO THE WORK FOR YOU!

To achieve this, open up the Motion panel and, under the Key Info section, select the IK line. A few more options will appear. Select the Biped's right hand and give it a keyframe by clicking on the red dot button (this will enable the remaining IK options).

Now select the white arrow icon before clicking on the red block. Change the radio button from Body to Object and then finally push the IK Blend up to 1 to make the movements translate along the whole arm. If you now scrub the timeline, this time you'll see the hand move in perfect unison with the block.

But this isn't a permanent process: remember, if at any given time you want to detach the hand and allow it unrestricted movement, simply apply another keyframe at the required moment in the timeline and then just change the radio button back to Body. Yes, it really is that simple, folks! [CO]



RIGHT: The Character Studio Key Info Motion panel's IK sub section is a tiny box of handy controls for all your additional linkage needs

MAIN RIG: With the additional IK link fully set up, the biped's hand follows the translation and rotation of the control object perfectly

LIGHTWAVE | UV Mapping clones in Modeler

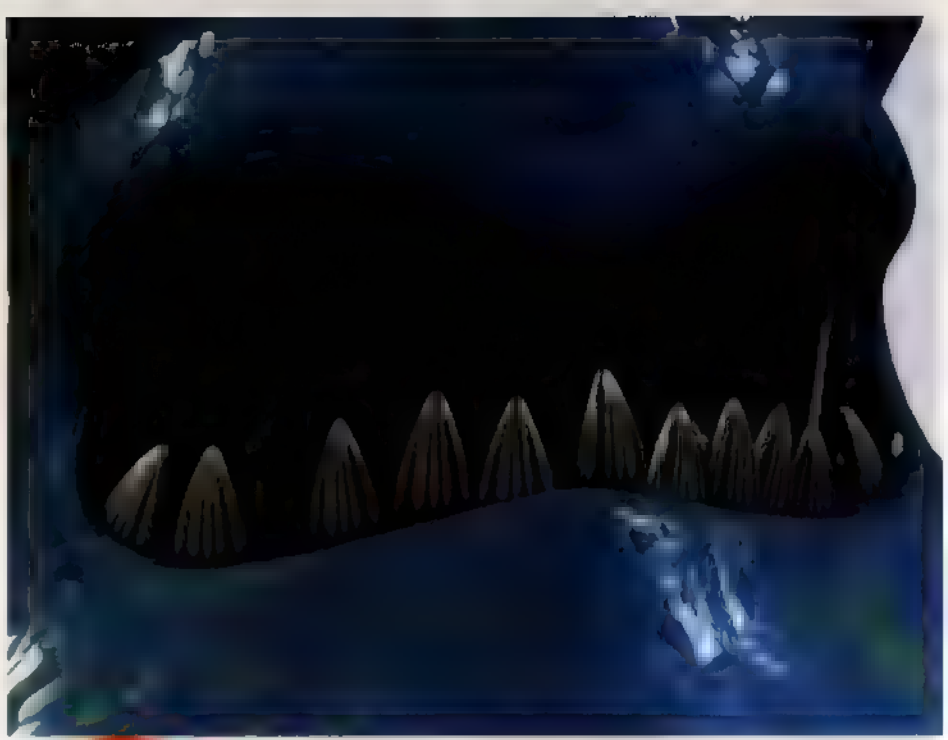
Q **"I've made hundreds of clones of an object in Modeler, but then I forgot to UV map it before I cloned. Help!"** BADGER MADGE, VIA EMAIL

A Ah, that old chestnut. You've made a model of a scary pointy tooth, and you copied and pasted it around loads of times, making lots of subtle variations to each tooth until you had a whole mouthful of scary pointy teeth. But *then* you remember that you're going to want to UV map them and, of course, you forgot to add a UV map when you had just one tooth, so you've got to start all over again. Argh!

However, help is at hand. With your completed mouthful of teeth in the foreground layer, select just one tooth and copy it into a new layer. Move and rotate the one tooth so that it's pretty much straight again, then apply a UV map to it. If it helps, you could add a Morph Target at this stage and distort the object into a new shape that makes it easier to UV map. You can distort your tooth into a straighter more cylindrical shape in a Morph Target, then apply a cylindrical UV map and then delete the Morph Target to get a neatly UV mapped tooth.

THE 'BKG TO MORPH' COMMAND IS THE KEY TO THE SOLUTION

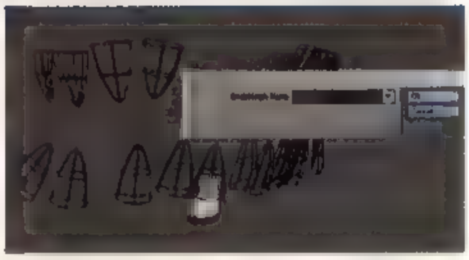
Clone the newly UV-mapped tooth so you have as many teeth as in the background layer. If there are too many teeth to count, simply note the number of polygons in one tooth (which Modeller displays in the bottom left of the screen), then the number of polygons in the many teeth and divide. You can use the Multiply > Clone tool to make the clones. Place the UV mapped teeth in the foreground layer and the mouthful of teeth in the background layer. From the Map tab, choose Bkg to Morph and the UV-mapped teeth will be morphed into the shape of the many teeth. Return to the base shape from the M pop-up at the bottom right, and then go Map > Apply Morph, choosing BkgMorph. You can now delete the BkgMorph morph target (press [_] with it selected) and carry on as if nothing had ever gone wrong! [BS]



● Teeth. Lots of them. Don't they look lovely? "Arrrggeghhh" and "Grrrr" and so on...

Q&A TIP

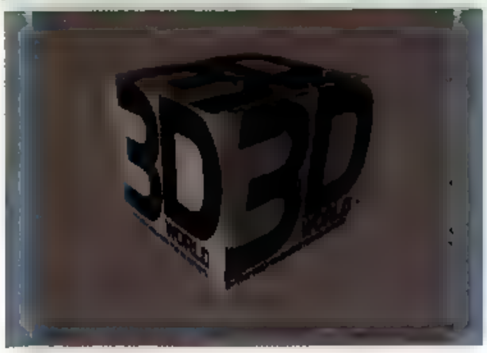
● If you're going to be dealing with Morph and UV textures at the same time, save yourself a lot of confusion by pressing [F8] to view the Vertex Maps panel

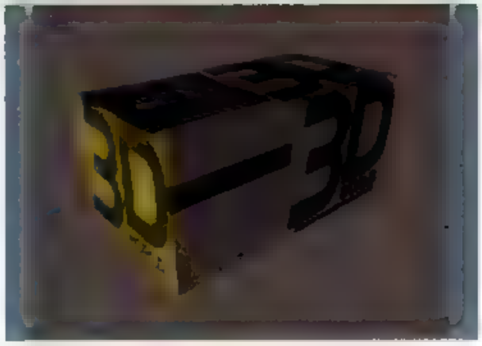


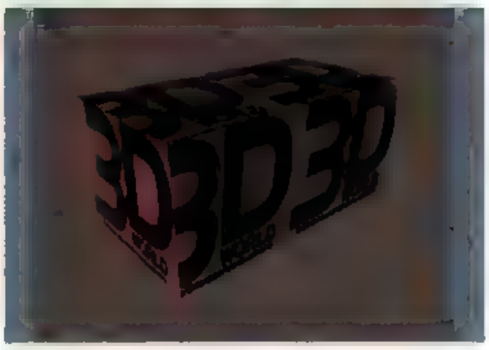
● ...and the key to the success of this impressive dental display is the 'Bkg to Morph' command

CINEMA 4D | How do I stop textures from 'stretching' when I extrude a face?

ITSALLGOOD, VIA THE FORUMS







01 Mind the UVs
When you first create a parametric primitive, there are UVs at each vertex. So for a cube like this there are eight UVs. The UVs help define where the 3D software will 'pin' the texture to the object's surface. Controlling UVs and their placement is critical to effective textures.

02 New polys, old UVs
When using tools like Extrude, new polygons are created (four new polys in this case). This means that there are also four new vertices. However, this doesn't create four new UVs. Essentially, the vertices at the beginning of the stretching and the vertices at the end are sharing the same part of the texture.

03 Adjust through projection
The quickest way to fix this (although not the only, and not the best in all cases) is to change your shape from using UVs to decide how the texture falls across the surface. Select the Texture tag and, in the Attributes Editor change the Projection drop-down menu from UVW Mapping to Cubic. [AW]

PHOTOSHOP | How do you create damaged painted metal textures like those in *Robots*?

PETER BENIC, VIA EMAIL

01 Base metal layer

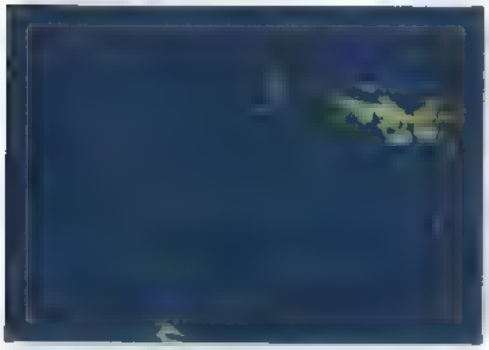
A scratched, coated metal surface texture consists of a number of layers. First create a base metal layer, which will serve as the underlying layer beneath the paint that will be visible through any scratches on the surface. For this particular exercise, we'll use a rusty photograph as a base, but this can be substituted with a regular metal image.

02 Undercoating

Now create an undercoating of paint 'primer' that lies beneath the actual paint coating on the metal. This adds additional detail to the scratches and a better sense of depth when applied to the surface with a Bump map. Create a plain-coloured layer and add any small scratches or grunginess to it just to break up the monotony of the colour a little.

03 Paint layer

Now the main paint layer. Add some scratches and grunge to the layer using any grunge brushes you may have or elements from other photographs blended above the layer. This is meant to be an old metal surface, so imperfections are important. They can be subtle or bold, depending on the look you're after.

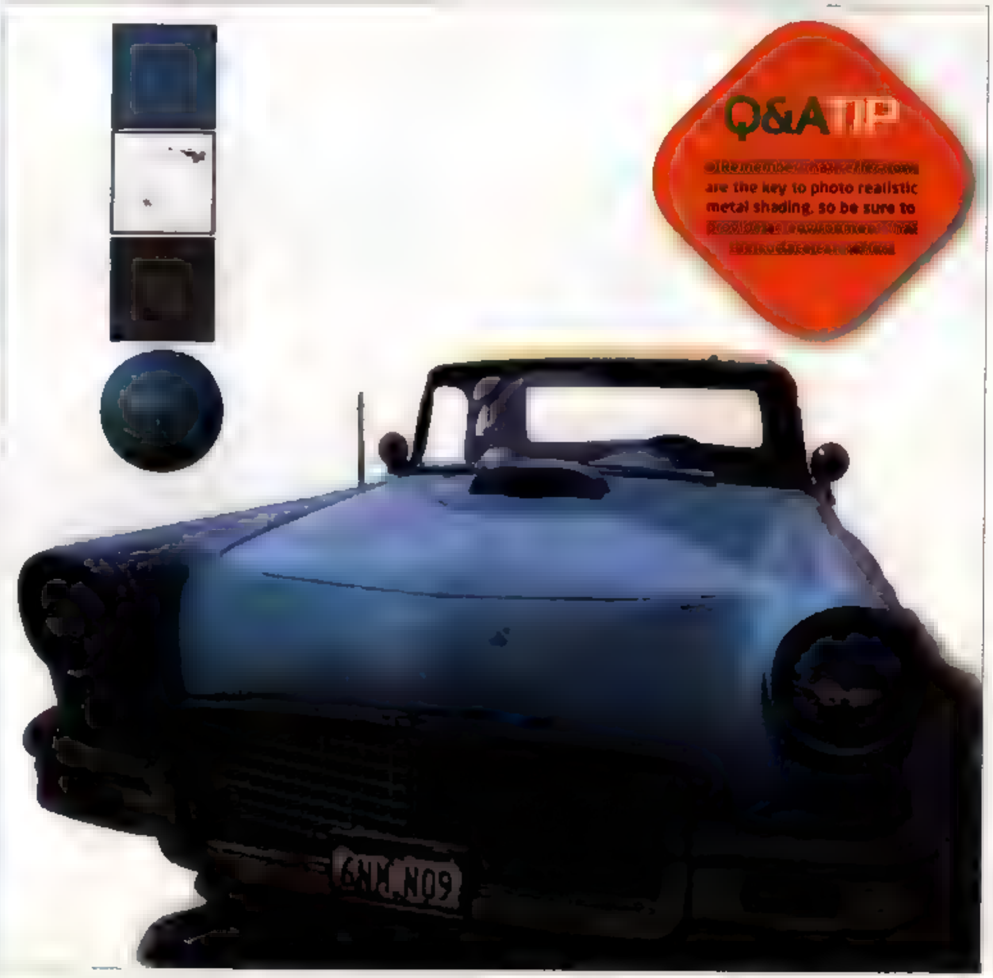


04 Scratching the surface

To show the underlying paint and rust layers, you need to 'eat away' areas of the top paint layer. I recommend getting some good grunge brushes for this task, or using contrasted black and white images in the alpha channel from which to make selections (this is included in the example PSD file on the CD). Use these techniques to scratch the surface to reveal the undercoat beneath.

05 Scratching the undercoat

Now go to the undercoat layer and, using your eraser, eat away sections of it in the areas revealed by the chipped paint layer you just created to reveal the rust layer beneath. Make sure you leave sections of the undercoat still showing along the edges of each scratch and chipped hole, or there wouldn't be any point to having this layer at all.



Q&A TIP

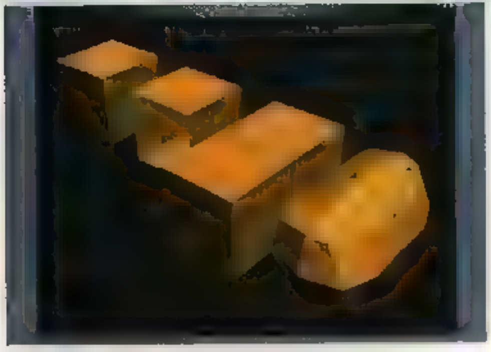
Remember that reflections are the key to photo realistic metal shading, so be sure to provide an environment that [illegible]

06 Apply the textures

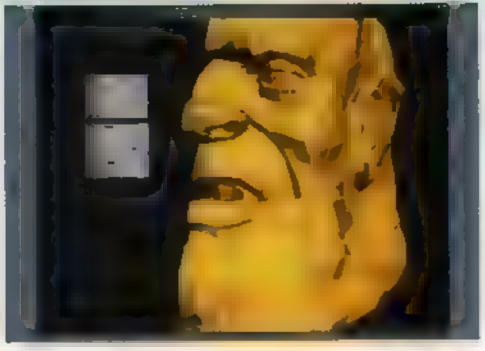
Save the resulting image as a Colour map and create a corresponding Bump map and Reflection map that will create the effect of indentations in the scratched and chipped areas, with the non-rusted paint areas having a degree of reflectivity. Apply the textures to a 3D object and render it in your 3D application. Of course, this example uses just a square swatch texture and is a very generic example of the effect. All you need to do this properly on a larger scale is take the concept and techniques demonstrated here and apply them to your specific model UV maps or texture projections. Remember to give some thought to the placement of the rusty areas instead of just randomly placing them all over the object. [LVDB]

SILO | Is there a symmetry feature that lets me focus on half the model?

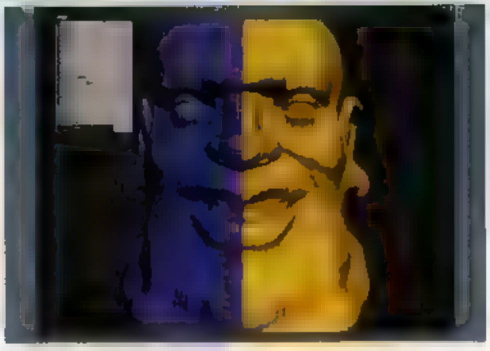
SIMON HASSEL, VIA EMAIL



01 **Applying symmetry across the X axis**
Silo implements this feature by utilising instances. This works by taking a mesh that is lying along the X axis and creating an instance copy that is a mirrored version. If the mesh has open edges these can be snapped to the centre axis by enabling Seam Preserve. This feature has a Tolerance setting that allows you to set the distance away from the axis before the snap-to-axis occurs.



02 **Creating an instance mirror**
The instance can't be edited but does reflect changes made to the initial model. The end result is that if you wish to model a head, for example, you can use all the available tools (Split, Bevel, Extrude and so on) on the right-hand side of a model and see the changes reflected.



03 **Mirror function vs De-instantiate instance**
When you've completed the modelling process, you need to convert the instance into a Mesh object, join it to the initial object and merge the points along the seam. There are two ways to do this. First, you can use 'De-instantiate instance,' which converts the instance copy into an editable mesh. Secondly, you can use Mirror on the original mesh to create a completely new mirrored version **[GS]**

MAYA | Scripting camera controls

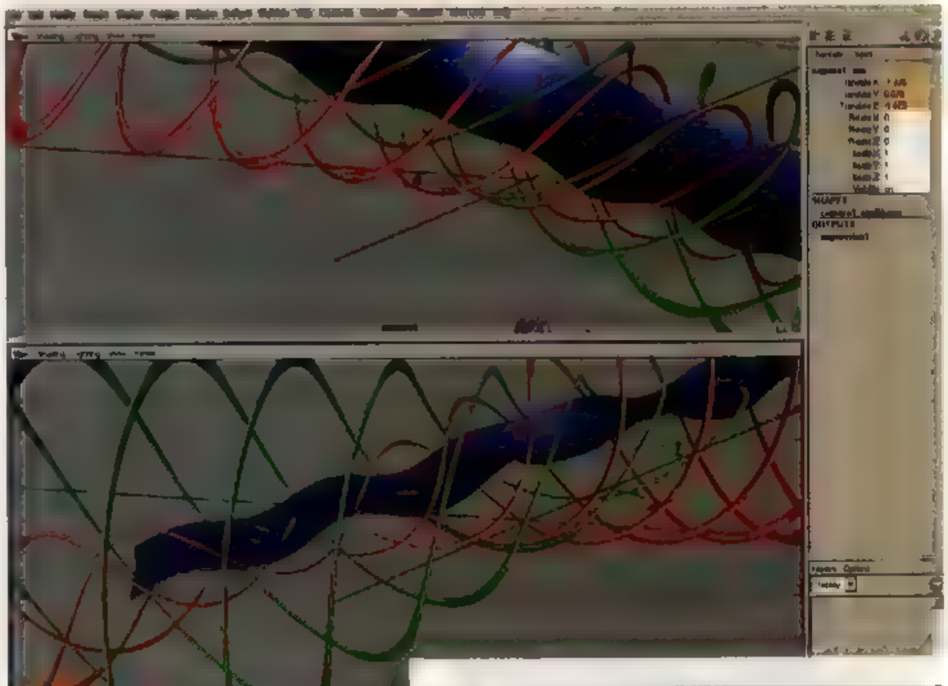
Q **"Is it possible to mirror the camera in *Maya*?"**
CHEESESCONE, VIA THE FORUMS

Wouldn't it be great if you could just take your cameraNode and do a minus scale in any axis? You can? OK, but can you see anything in its viewport? No, because the camera is scaled by -1 So how can you see your animation mirrored? One way is to have two cameras, some attributes and a simple MEL script.

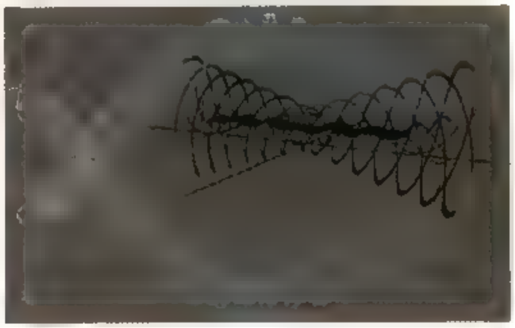
First, go to Create > Cameras > Camera and Aim twice giving you camera1_group and camera2_group. Animate camera1 and camera1_aim as normal. Now open up the Expression Editor and type 'camera2.tx = camera1.tx; camera2_aim.tx = camera1_aim.tx, camera2.ty = camera1.ty; camera2_aim.ty =...' and so on for all the translation nodes of camera2 and its aim point. Camera2 now emulates camera1. In your newly created expression, add these three lines. 'int $mirX = 1; int $mirY = 1, int $mirZ = 1;' This creates three integer variables for mirroring our already created expression. Click Edit at the bottom of the Expression window to save your expression changes.

Now let's add our mirror variables into our expression. Change 'camera2.tx = camera1.tx;' to 'camera2.tx = camera1.tx * $mirX;', 'camera2_aim.tx = camera1_aim.tx;' to 'camera2_aim.tx = camera1_aim.tx * $mirX;' and so on, multiplying the 'translateY's by $mirY and the 'translateZ's by $mirZ. Click Edit and play your animation. No change there, so go back to your expression and at the top change the '1' Of $mirX to '-1' Click Edit and now play back your animation. You should now have camera2 mirroring camera1 in the X axis. You can change the value on $mirX, $mirY and $mirZ in the Expression Editor and get your mirror results for each axis.

But let's create three attributes on camera1 as mirror controls. Select camera1, hit [Ctrl]+[A] to open the Attribute Editor and click Attributes > Add Attributes... In the pop up window type 'mirrorX' as attribute name, set the Data Type to integer, set Minimum to -1, Maximum to 1 and Default to 1 Click Add. Using the same settings, create mirrorY and mirrorZ. You should now see these in camera1's Channel Box. Change your expression thus: 'int $mirX camera1.mirrorX, int $mirY = camera1.mirrorY, int $mirZ = camera1.mirrorZ. Now you can animate or change attributes on camera1 and see the mirrored results in camera2 **[GN]**



● Camera1 on top and the mirrored move in camera2 beneath



● Using some artificial ghosting, you can see how the camera2 follows a similar mirrored path to camera1

Q&A TIP

● In production, mirrored cameras are often used to create fake reflection passes of varying quality that can be blurred or varied in hue during compositing

POSER | Mimicking volumetric lighting

"How can I create the effect of volumetric lighting in *Poser*?" **SIMON BRADSHAW, VIA EMAIL**

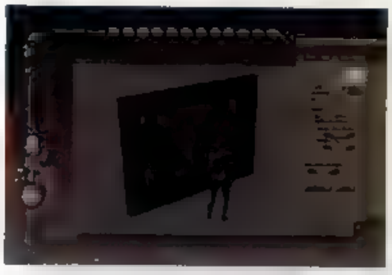
Although *Poser* is not as advanced in regards to lighting as some software it is still possible, with a little effort, to create a scene that has dramatic and atmospheric lighting. It's even possible to mimic the look of volumetric lighting. The technique described below requires the Firefly render engine that was implemented in *Poser 5*.

Once you have your figure posed and your camera angle set, add a box prop to your scene. Using one of the other view points, position it behind the figure and scale it until it fills the background of your scene. Next, switch off all but one of the lights (the on/off option is located in the Light Properties box). In the Properties box of the one remaining light, select Spot (by default, *Poser* lights are set to Infinite). At the bottom of the Properties box you'll find the Atmosphere strength dial. Set this to 1. Now switch to the Parameters tab. Here you'll find various controls over the angle, spill and intensity of the light. Set the start angle and end angles. For the example shown on the right, we used a setting of 31 for the start and 21 for the end angle. As well as using the dials, you can double click on any of the options and manually type in the settings.

WITH A LITTLE EFFORT YOU CAN CREATE DRAMATIC LIGHTING

With the light still selected, go to the Object menu and select Point At. A hierarchy window will appear, listing all elements in your scene. Scroll down the list and select your figure's head. Use the Translate tool to position the light.

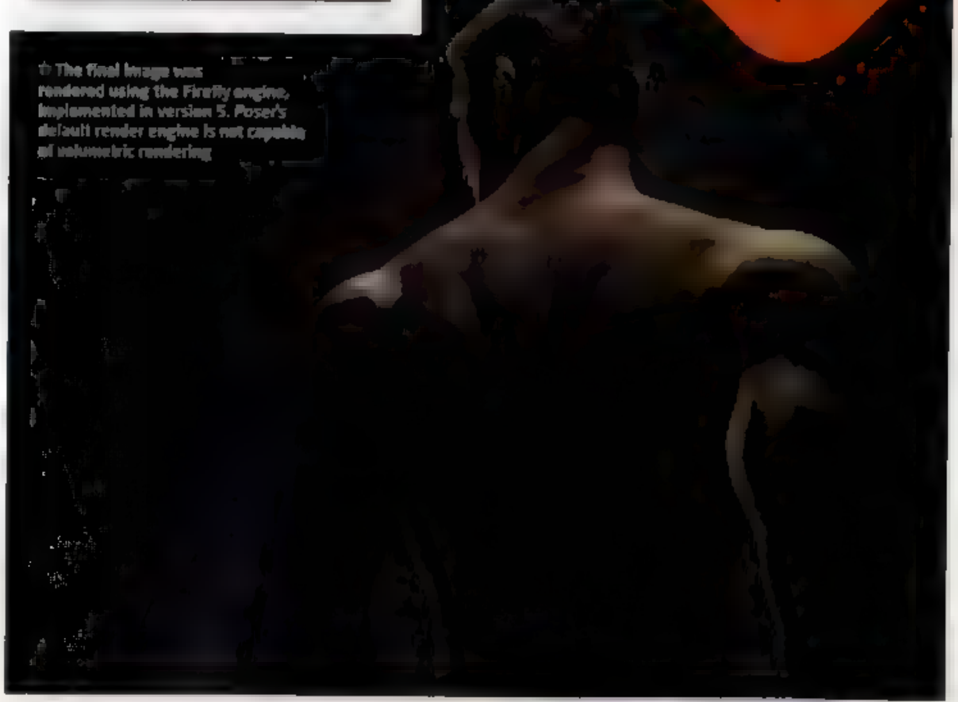
Next, go to the Material room. From the Object menu on the Shader window, select Atmosphere. Check Volume On and set the Volume Density to 0.01. When rendering your scene in Draft mode, make sure to select Cast Shadows option from the render settings window. **[I&DH]**



● To create the effect of volumetric shading, import a box prop into your scene, scale and position it behind your figure, then set up your lights as described in the text

Q&A TIP

● For more natural looking shadows in your renders, set the Shadow Map on your lights (located in the light's Properties box) as high as you can



● The final image was rendered using the Firefly engine, implemented in version 5. Poser's default render engine is not capable of volumetric rendering

CONUNDRUM | Send us your solutions to this month's brainteaser

Each issue we set you a real world 3D problem to solve. The sender of the best solution wins the book or training DVD shown on the right. Our conundrum for last month was posed by *Maya* user Asaf, who asked:

"Is it possible to create blendShapes that will also change the texture of an object as I go from one blendShape to another? If so, how do I set them up?"

The most comprehensive answer was supplied by new forum user Dorota Sikorska, aka FairyDora. The detailed solution is too long to list here, but can be found on the appropriate thread in the *Maya* section. In essence, FairyDora's method involves setting up a blendShape source (the object that will be changing) and target (the object whose shape will be acquired by the source), setting up a blendColor node in the Hypershade to mix the two textures required, then using the Set Driven Keys to connect the two. As the blendShape changes the shape of the object, the blendColor changes its texture.

This solution was extended by forum regular Myk, who pointed out: "There are actually three ways to connect the blendShape to the blendColor. Firstly, SDK, as you suggest. Secondly, you can use an expression (my preferred solution: blendColor.blender = blendShape1.weight[0]; f.ex). And thirdly, by using the Connection Editor (or the equivalent MEL command connectAttr)."

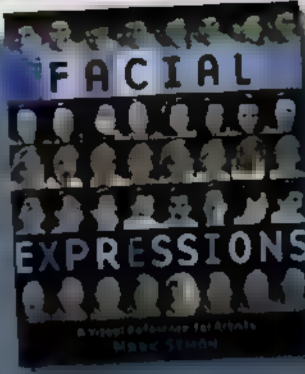
Myk also supplied sample scenes to illustrate the technique which, again, can be downloaded from the links provided on the relevant forum thread. Congratulations to both Myk and FairyDora: this was a tough one to call, but since Myk won the last *Maya* related conundrum prize we offered, we felt it was fair to award this one to FairyDora, who wins a copy of CG Toolkit's three DVD training set, *The Making of Leon*.

THIS MONTH'S QUESTION

Our question for issue 69 concerns facial animation in *3ds Max* and is posed by jonah_the_chef, who asks:

"Most animators seem to stop with the lips and teeth when lip-synching. But how do I create realistic animation for my character's tongue? I'm not looking for a complete solution here, just advice on the best way to tackle the problem."

You can post your solutions on the forum, on the relevant threads in the 3ds Max or Mag Related sections. Alternatively, email us at the address listed at the side of the page. The sender of the best solution will win themselves a copy of the invaluable *Facial Expressions – A Visual Reference for Artists*.



Win Maya training DVDs

Send in your solution to this month's brainteaser and you could win a copy of *Facial Expressions – A Visual Reference for Artists* by Mark Simon. An invaluable aid for character animators, the book contains images of over 50 male and female models with ages ranging from 20 to 83, photographed in a variety of facial expressions and from multiple angles. For more information, visit **www.watsonguptill.com**

To enter, post your answers on our forum **http://forum.3dworldmag.com**

Contact us | You can also email your Q&A questions to 3dw.qanda@futurenet.co.uk

Stay one step ahead.

Alias MotionBuilder 6 provides greater productivity and seamless integration with your existing 3D tools.

Alias MotionBuilder 6, recognised as the foremost 3D character performance and animation system for game, film and broadcast production, has taken the next step in animation software with the release of MotionBuilder 6.

In this release, Alias has added new character performance and animation technology, pipeline tools, and workflow enhancements. MotionBuilder 6 is truly dedicated to animation…from its unique real-time performance and full-body IK rigs, to its story timeline and integration with your preferred 3D tools. Try it and you'll discover the difference Alias MotionBuilder 6 can make in your creativity and productivity.

the next step in animation software is here, and now shipping. Visit www.alias.com/motionbuilder to learn more about MotionBuilder 6.

Alias MotionBuilder 6

Alias
www.alias.com

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IN ISSUE #69

ANIME SPECIAL - 16 AUGUST 2005

REVIEWS

HARDWARE / SOFTWARE / BUYERS' GUIDE

RW
RW
DVD R/RW
disc
OR
PX-7165A
RW
DVD R/RW
disc
DVD R/RW
RW
LaCie

DVD Writers

GROUP TEST DVDs are useful for storing data, photos, and recording movies, but is there really that much difference between writers?

BY MAT BROOMFIELD

Desktop movie production has been a reality for a number of years, and with dual-layer DVD writers, there's no reason why your productions shouldn't be the same quality as those from the studios. Whether you're encoding video you've filmed, or you're making your own animated 3D extravaganza, DVD provides you with a medium that ensures maximum video quality.

With blank discs costing as little as 16p each (about 30 cents), DVDs are good enough value to use as a disposable media. They're cheap enough so that those at the start of their careers can afford to send out hundreds of demo reels to competitions or prospective employers. Their low cost makes them an ideal marketing resource, enabling companies to put out their message professionally and very cost-effectively.

In this age of virus ubiquity, you can never be too thorough about backing up your data, and with a dual-layer capacity of up to 8.54GB, DVDs provide a useful tool for protecting your company's data assets.

You still pay a massive premium for dual-layer discs, which cost at least ten times as much as single layer. The format lets you store more high-quality video, but as an archival medium it's not a format that's worth considering. Rewriteable discs are environmentally friendly but they can be two or three times more expensive than write-once DVD-R discs. Typically, it takes up to ten times longer to burn a rewritable disc when you include the pre-erasure stage that you go through if you wish to completely overwrite. The energy consumption cancels out any environmental benefits, and the added time and cost makes them unattractive in a busy office.

DVD PROVIDES YOU WITH A MEDIUM THAT ENSURES MAXIMUM VIDEO QUALITY

DVD writers are available in both internal and external varieties. Internal ones can be connected via SCSI, IDE or SATA, while the external ones come in FireWire and USB 2 varieties. External ones are more versatile because they can be shared between machines, but they're generally more expensive. A number of even higher capacity technologies are promised for Europe by the end of the year, but in terms of compatibility with what is the fastest growing video distribution media of all time, only DVD meets the standard.

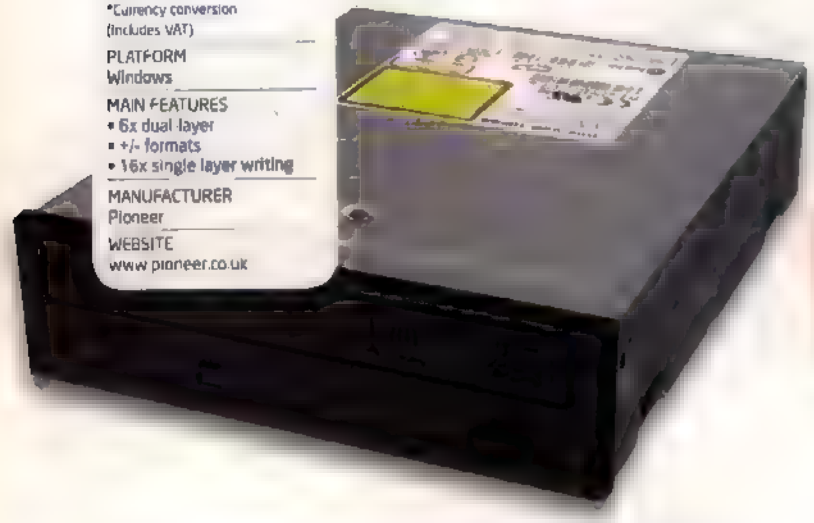
● On test this issue (clockwise from top): Lite-On SOHW-1673S, Samsung TS-H552, LaCie LightScribe, Plextor PX-716SA, Pioneer DVR-109BK

TALKING POINT | Building your discs

ALTHOUGH MOST DRIVES come with a variety of software packages, there are two main commercial programs that rule the roost when it comes to building your CDs and DVDs.

Nero seems to be the program of choice for the more technically-minded users, and it incorporates a number of useful advanced functions, including overburning. But if you simply want a quick and easy way to build a disc, whether you plan to store data, archive your video and music collection, or create a photo album, *Easy Media Creator 7.5* is certainly one of the friendliest choices out there. You can buy *Nero* from Nero AG at **www.nero.com**. *Easy Media Creator* is published by Roxio at **www.roxio.co.uk**

▶



DETAILS

PRICE
Cream
£37.59 / $68* / €56*
Black
£41.11 / $75* / €61*
*Currency conversion
(Includes VAT)

PLATFORM
Windows

MAIN FEATURES
- 6x dual-layer
- +/- formats
- 16x single layer writing

MANUFACTURER
Pioneer

WEBSITE
www.pioneer.co.uk

Pioneer DVR-109BK

When you need dependability but no extra software, the Pioneer is one serious contender

Pioneer's drives are widely used in third-party external units, and for two good reasons – first, they're very reliable and, second, they're an industry standard, offering the greatest level of compatibility

If you buy a Pioneer drive and use branded media, or DVDs with a Ritek G05 dye, then you are guaranteed the widest possible compatibility with set-top players, lap-tops, consoles, and other 'problem' systems.

Our review drive offers almost identical performance to the group-winning Plextor drive, except the Plextor offers 48x CD writing, whereas this does 40x. That means that it will take an extra 18 seconds per 650MB CD. If that kind of delay matters to you, then you should probably be considering a multi-burner DVD/CD duplicator in any case.

At 6x for Minus RW writing, the DVR-109 is faster than the Plextor, matched only by the Lite On. But you have to question how significant a role rewriteable media will play when DVD-R discs are so inexpensive.

The drive includes a standard 2MB data buffer and under-run protection to minimise the danger of trashed discs due to data interruptions.

The drive comes in either black or cream, and the distributor (Misco) charge a whopping £13 more for black.

The drive is an internal unit that connects via an E-IDE Atapi cable. It's less elegant than SATA, but all current PCs support it, making it the most compatible.

This is the only model in our round-up that's devoid of any software. We prefer this, particularly for the professional market, because it's possible that you have your own software.

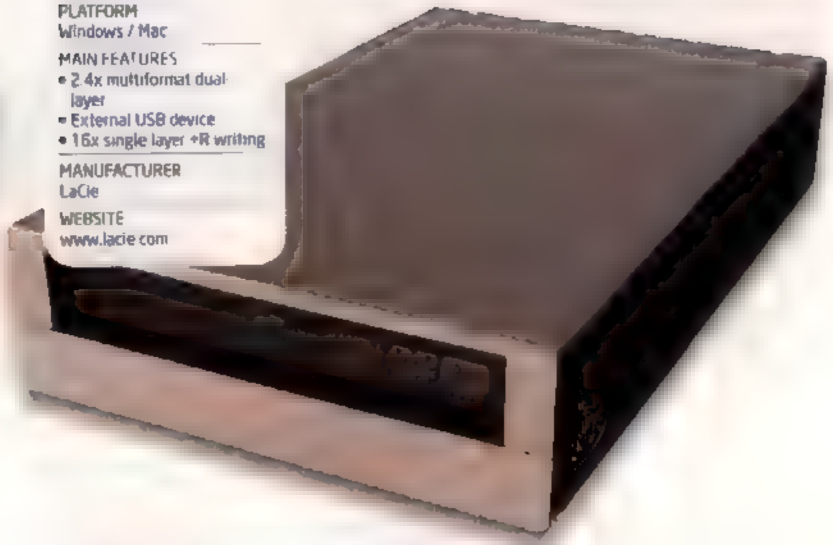
In terms of dependability, compatibility, upgradeability, and simple ease of use, they don't come any better than the Pioneer DVR-109.

VERDICT

PROS
- Compatible
- Dependable
- Good performer

CONS
- It's not the Plextor drive!

RANGE OF FEATURES	8
VALUE FOR MONEY	8
OVERALL	8



DETAILS

PRICE
£103.40 / $188* / €155*
*Currency conversion
(Includes VAT)

PLATFORM
Windows / Mac

MAIN FEATURES
- 2.4x multiformat dual-layer
- External USB device
- 16x single layer +R writing

MANUFACTURER
LaCie

WEBSITE
www.lacie.com

LaCie LightScribe

When stick-on labels just don't cut it, this latest integrated labelling technology could be for you

Adding printed labels to your DVDs makes them look more professional, especially when you're using them for marketing purposes, or as retail products. Stick-on labels look good, but come with the danger of peeling off inside a user's machine. Inkjet printing is convenient, but the images tend to look rather dark and lacking in contrast. And thermal printing provides a professional finish, but is really expensive. But now there's another technology – LightScribe

LightScribe is essentially laser etching. It uses the writer's lasers to produce a greyscale image on top of the disc. Basically, you burn the data onto the disc as normal, then flip it over and use the software to burn an image onto the other side. There are two massive limitations though – first, at 20 minutes per image the process takes six times longer than the writer takes to burn a disc, and second, the discs cost four times as much.

Fortunately, at just over £100 for this external USB2 drive, it's not an option that you have to pay extra for. In fact it's a pretty decent price for a standard external drive.

This is one of those drives that can't write Minus R discs as quickly as the Plus R ones. Although it can do Minus R discs at 16x speed, it only does Plus R at half that. And it burns rewriteable in both formats at just 4x speed.

This is also one of those drives that write to the second layer at a much slower speed. So the average write speed is just 2.4x. So it'll take over 43 minutes to write a full 8.54GB dual-layer disc.

The LaCie is reasonably priced, and LightScribe technology is a great idea that will have more merit as costs fall and speeds increase. It lacks the cutting-edge performance of its rivals, but the versatility of USB connectivity is compensation enough.

VERDICT

PROS
- External
- LightScribe labelling

CONS
- LightScribe and Dual layer are very slow
- - performance inferior to +

RANGE OF FEATURES	7
VALUE FOR MONEY	8
OVERALL	7

DETAILS

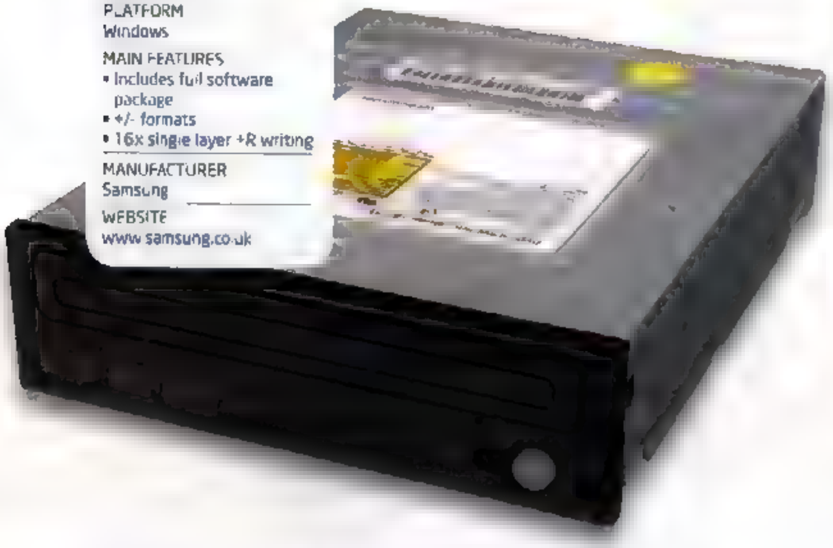
PRICE
£54.96 / $100* / €83*
*Currency conversion
(Includes VAT)

PLATFORM
Windows

MAIN FEATURES
- Includes full software package
- +/- formats
- 16x single layer +R writing

MANUFACTURER
Samsung

WEBSITE
www.samsung.co.uk



Samsung TS-H552

With this bundle, the retailer has decided that the software is more important than the drive

This is a strange kit to review because it was submitted not by the drive's manufacturer, but by the publisher of the software supplied with it. Roxio is one of the largest publishers of consumer DVD authoring software, and this drive comes bundled with a full version of Roxio *Easy Media Creator 7*.

It's common for drive manufacturers to bundle a 'light' or special edition version of commercial authoring software and, in most cases, these packages provide sufficient functionality for many users. The presumption is that you'd prefer to get the complete package at a discount. The software retails for £50 and the drive on its own is £30. That means that you only save £20 by buying it as a bundle. In the professional market you're likely to have your own choice of software for creating photo slideshows, DVD movies, or data backups, so this is not a particularly compelling option, versatile though the software may be. The drive's performance exceeds that of the external LaCie model, but the cheaper Lite-On drive is faster and has its own (somewhat lesser) software bundle.

The Samsung drive is an internal model that connects via E-IDE. It offers dual-layer burning but, like the LaCie, it only does so at 2.4 speed. Like the LaCie the Samsung offers a performance disparity between Plus and Minus R media, although you don't suffer as much for using Minus R discs this time because it can manage 12x data transfer. If CD writing and reading is important, this is a reasonable choice, particularly if you still use rewritable media, which it can produce at 32 speed. On its own the Samsung represents superb value for money. But as part of a bundle with Roxio's (excellent) software, it's far too expensive. Professional users lack any incentive to consider it.

VERDICT

PROS
- Excellent CD performance
- Good DVD+R performance

CONS
- Slow dual-layer
- Inferior Minus R/RW

RANGE OF FEATURES	7
VALUE FOR MONEY	5
OVERALL	6

DETAILS

PRICE
£39 /$46 / €58
(Includes VAT)

PLATFORM
Windows

MAIN FEATURES
- 4x dual-layer
- +/- formats
- 16x single layer writing

MANUFACTURER
Lite On

WEBSITE
www.dabs.com

Lite-On SOHW-1673S

Does cheaper always mean worse when it comes to hardware, or is it worth considering this drive?

Very rarely have we bought cheap computer equipment and not lived to regret it: on first glance, the equipment may seem to provide the same functionality as its costlier rivals, but then subsequently you discover that it doesn't, or it's made with cheaper components that lack the durability. Indeed, this was an error we made purchasing an early Lite-On DVD-ROM drive that subsequently was unable to read the writeable formats of the day.

Having said that, Lite-On has quickly risen to become one of the most popular high street brands due to its combination of versatility and value.

This drive offers dual-layer like the others, but only using Plus R discs. These are the kind of tiny details that can trip you up with a budget unit if you require a specific type of compatibility.

Apart from that one little glitch, it does offer excellent performance across the entire spectrum. It can produce both Plus and Minus R discs at 16 speed. As usual for high-speed RW drives, its Plus RW performance is faster than its Minus speed – 8x and 6x respectively. Thus, its single layer DVD writing numbers are as fast as anything else in this test.

At 48x for CD reading and writing, no other drive is faster, although the Samsung drive is a lot quicker at writing CD-RW discs – if anyone in the world still uses them.

Connecting to your computer via internal E-IDE, the drive is compatible with just about all desktop systems. It doesn't come with IDE cables, so make sure you order them at the same time you buy the drive, unless you plan to run it as a secondary device on an existing cable.

Finally in its favour, the kit includes the popular and powerful *Nero 6* authoring software, enabling you to use it straight out of the box.

VERDICT

PROS
- Inexpensive
- Good performer
- Good software

CONS
- Plus R dual-layer only

RANGE OF FEATURES	7
VALUE FOR MONEY	9
OVERALL	8

▶

PLEXTOR
PX 716SA
RW
DVD

THIS ISSUE'S WINNER

Plextor PX-716SA

As the most expensive drive in our round-up, just what's so special about this writer that earns it the number one spot?

DETAILS

PRICE
£105 / $162 / €132
(includes VAT)

PLATFORM
Windows

MINIMUM SYSTEM
- Pentium 4 1 4GHz
- 256MB RAM
- 20GB hard disk
- Serial ATA
- 1 spare 5.25 inch internal drive bay
- Windows 2000 or XP

MAIN FEATURES
- Dual layer
- 6x dual-layer writing
- 16x single layer writing
- Plus and Minus R/RW compatible
- Writes CDs up to 99 minutes long
- Includes vast bundle of software
- Upgradeable firmware

MANUFACTURER
Plextor

WEBSITE
www.plextor.be

CONTACT
www.dabs.com

Generally speaking, the most expensive product in our group tests is unlikely to be the winner - after all, you pay extra for decent functionality. However, when we're talking only £105 for the top product (and it's a product this versatile), the price is barely an issue at all.

From the moment you remove the drive from its box, you can see that it's better-made than the rest, with its stylishly trimmed drawer mechanism. Something else that sets it apart is the fact that it comes with both black and white bezels as standard, so whatever coloured fascia you have to match it up to, you can choose a colour that looks right.

The drive is the only one in our round up to connect to your computer via Serial ATA, a high speed serial interface and the successor to E-IDE. Because it only uses a slender cable, it lets you keep the inside of your system free of ugly, space hogging, airflow-impeding serial ribbon cables. It's also easier to install because you don't have to mess around with jumper settings, worry about other drives in the system, or remember which is the master or slave.

At 8MB, the drive has four times the data buffer of its rivals. A larger data buffer means that more data can be stored in the drive's memory, which also means extending the amount of time before copying or writing interruptions ruin a disc. Having said that, the Plextor PX-716SA has buffer under run protection in any case and this virtually eliminates trashed discs, regardless of the buffer size.

SURE IT'S EXPENSIVE, BUT WITH A PRODUCT THIS VERSATILE, THE PRICE IS BARELY AN ISSUE AT ALL

The drive writes single and dual-layer DVDs, in both Plus and Minus R and RW formats. Some profess that Plus R discs (which tend to be slightly more expensive) are more widely compatible with set top DVD players, but in our experience Minus R discs work better. In any case, you can choose according to your preference.

You can create DVD R discs at the same speed in both formats, but when it comes to rewriteable discs, you can create Plus RW volumes at twice the speed of Minus RW - 8x instead of 4x.

Impressively, you can also create dual layer discs in both formats at up to 6x, with an appropriate firmware upgrade. The fact that you can upgrade the drive's capabilities via a downloadable software upgrade is also a bonus.

This is the only writer in our test with which you can create 99-minute audio or data CDs, which enables you to store up to 1GB of data on a CD. It's not really an ideal data storage solution though, as 4 7GB DVDs cost less than 99-minute CDs, but for special audio projects it does give you that extra option.

VERDICT

PROS
- Supports every DVD and CD format
- Fast-writing
- Big buffer
- Firmware can be upgraded

CONS
- Expensive
- Most of the software is only trial versions

RANGE OF FEATURES	10
VALUE FOR MONEY	9
OVERALL	9

RW
RW
DVD
PLEXTOR
RW
DVD
DVD

WITH DVD WRITERS, THERE'S NO GREAT CHASM SEPARATING THEM IN TERMS OF THEIR CAPABILITIES

CONCLUSION | Finding the right writer

This roundup has been quite unlike the others we've produced. Usually, there are five very distinctly different products, each with vastly differing performances, characteristics, and price points. But with DVD writers, there's no great chasm separating them in terms of their capabilities

They all do DVD burning at about 16 speed, they all do dual layer and they all write CDs at around 40-48 speed. Moreover because there are few 16 speed DVD blanks available, and burning can become an unpredictable process at the top speed, it's entirely possible that you won't be writing at 16x DVD or 48x CD anyway. The solutions to the hazardous nature of high-speed burning are several: connect the writer to only a decent computer, with a regularly defragmented hard drive, don't run other programs while you're burning; and only use branded, appropriately speed rated discs like TDK, Maxell or Verbatim.

Another reason that most people won't be burning at 16x very often is the fact that the discs cost considerably more to purchase. Even cheap, bulk packed DVDs can cost 50 per cent more, but once you move into branded discs, it may cost you several times more, just to save yourself three and a half minutes per disc. Just to give you an idea, at 8x, it will take 7.1 minutes to burn a 4.7GB single-sided DVD, and at 48x it will take 90 seconds to burn a 650MB CD. In both cases there's a lead in and lead out writing process that can add anything from a few seconds to over a minute depending upon the software you use.

MR WRITER

The great thing about this group test was that every entrant had at least one valuable unique selling point. The Pioneer offers ultra compatibility at a low cost, the LaCie has LightScribe laser labelling, the Samsung comes with a full version of *Easy Media 7*, the Lite-On is extremely inexpensive, while the Plextor offers the broadest range of writing options.

Although the price was a minor issue to think about, most professionals are usually more concerned with decent performance and useability, rather than saving £50 here or there, so the price barely weighted the results at all (except at the end, that is). To be honest, from the outset, our primary consideration was compatibility, dependability and performance.

Dependability is impossible to assess in a review process taking just a week, so we have to go by past reputation. This is an ongoing process, subject to revision whenever we use products. However, by that litmus test, the choice was immediately reduced to the Pioneer and the Plextor.

In the end, the Plextor won us over purely because it gives the user more quality for the money ●

PERFORMANCE COMPARISON

MODEL	SINGLE/ [illegible] LAYER	SPEED [illegible] LAYER +	SPEED [illegible] RW	SPEED +RW	SPEED [illegible] RW	DVD-ROM DUAL	MAIN SOFTWARE	SPEED [illegible] ROM	SPEED	CAPACITY	BURNPROOF/ [illegible] UNDER-RUN	BUFFER	INTERFACE	PRICE	SCORE
Plextor PX-716SA	Both	6x	6x 4x	[illegible]	4x 24x	6x	[illegible]	48x	N/A	8.54GB [illegible]	Yes	8MB	Serial ATA	£[illegible]05	9
Pioneer DVR-109BK	Both	6x	[illegible]	6x 8x	[illegible]	[illegible]	No software	[illegible]	N/A	[illegible]	[illegible]	[illegible]	E-IDE Atapi	[illegible]	8
LaCie LightScribe	Both (Dual only available in +R)	[illegible] 4x	8x 4x	6x 4x	40x 24x	6x	[illegible]	[illegible]	Approx. [illegible] mins per image	8.54GB [illegible]	Yes	2MB	USB 2	£[illegible]	7
Samsung TS-H552	Both (Dual only available in +R)	5x	6x [illegible]	6x 4x	48x [illegible]	[illegible]	[illegible]	[illegible]	N/A	[illegible] 2MB	Yes	2MB	IDE	£39.99	6
Lite-On SOHW-1673S	Dual	4x Plus only	8x 6x	[illegible]	48x 24x	6x	Nero [illegible] 6, PowerDVD 5	48x	N/A	Not quoted	Yes	2MB	E-IDE Atapi	£39	8

DETAILS

PRICE
- Boxed
  £70* / $110 / €100*
- Download
  £63* / $100 / €90*

*Via www.eovia.com (excluding VAT)

PLATFORM
PC / MAC

MINIMUM SYSTEM
PC
- Windows NT4
- 500MHz Pentium processor (1GHz recommended)
- 256MB RAM (512MB recommended)

Mac
- Mac OS X 10.2
- 500 MHZ PowerMac G4/G5 (1GHz recommended)
- 256MB RAM (512MB recommended)

MAIN FEATURES
- Landscape generation and animation
- Direct link to *DAZ|Studio*
- Many import options
- Includes Tree Lab
- New lighting modes
- Higher-res landscapes
- Includes hundreds of preset scenes and objects
- More powerful network rendering
- Textured OpenGL display

DEVELOPER
DAZ Productions

WEBSITE
http://bryce.daz3d.com

Bryce 5.5

After many incarnations, Bryce is now an ultra-budget landscape-creation package. So what does it have to offer the average 3D user?

BY MAT BROOMFIELD

Few programs have had a more chequered history than *Bryce*. Over the past five years, the software changed hands more times than a ball in a rugby match. But is that because the program is a hot potato, or is it simply too good to die?

Bryce was originally developed by MetaCreations and, at the time, towered above the competition. However, since then, rivals like *MojoWorld*, *WorldBuilder* and, most prominently, *Vue* have motored on, while *Bryce*'s development has remained virtually static. Now, however, DAZ Productions has purchased the program from previous owner Corel, and it fits very neatly into its plans for the future of 3D.

The first thing DAZ did was slash the price, making *Bryce* even more affordable to the masses. Now, with this latest version, the developer has added some important new functionality that enables the program to integrate more smoothly with your other 3D apps. Perhaps the most important new feature is the program's interoperability with *DAZ Studio*. *Studio* is the company's attempt to create a figure-posing application that can rival *Poser*. DAZ created the program when *Poser*'s future looked shaky, and while *Studio* is competent, it pales in comparison with the more established product. However, it is free, giving DAZ a vehicle to promote the figure libraries that are its main source of income.

© Rochr

An example of the high-quality results achievable in *Bryce 5.5*. Although the program has pretty lousy non-terrain modelling tools, people insist on using it to produce fantastic scenes like this one...

Bryce now sports a *DAZ|Studio* button at the top of the screen. When you click it, *Studio* launches, pushing *Bryce* into the background. You can load a scene into *Studio*, or create one from scratch. Then, when you select the Return to Bryce option, *Studio* is minimised and *Bryce* pops up again, complete with the meshes from your *Studio* scene.

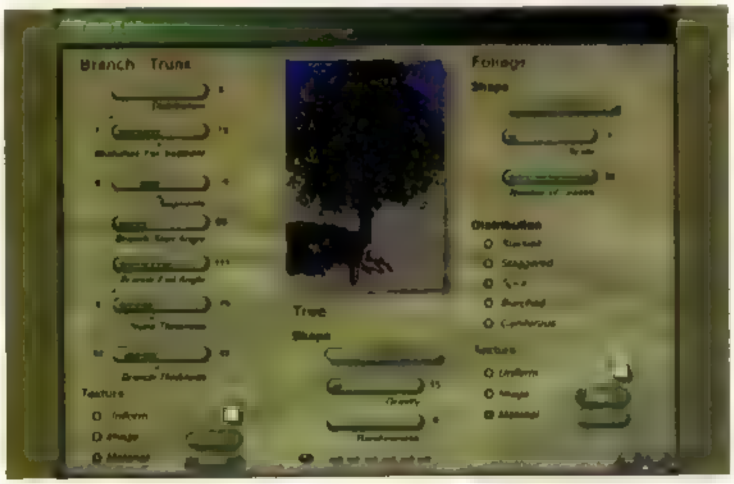
You can return to *Studio* any time and tweak your figures within that program, although the *Bryce* terrains are not displayed in *Studio*, which would have been a nice reference tool for posing purposes.

WHAT'S THE CATCH?

DAZ Studio has simple animation capabilities, but they don't transfer to *Bryce*. This is the greatest limitation of the route DAZ has opted for. Whereas programs like *Vue* can import fully animated *Poser* scenes complete with hair and cloth, *Bryce* users can only import static *Studio* scenes. That makes the program great for creating artwork such as book covers, posters and product packaging, but almost impossible to use if you require figure animation.

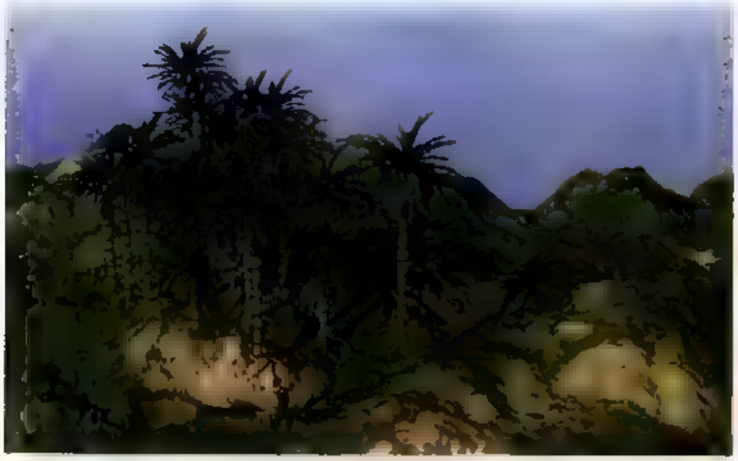
But, like the competition, *Bryce* comes with a wealth of presets, materials and objects, including a vast variety of trees. Annoyingly, however, the trees cannot be selected visually by browsing a catalogue. Instead you must [Alt]-click the tree icon, then choose from a list of tree names. DAZ says that this is because of legacy problems that make the program crash when it tries to display the thumbnails. This may be the case, but surely such a simple requirement should have been implemented by now?

However, the usefulness of the tree technology is increased by *Bryce*'s Tree Lab, in which you can design your own trees, or modify existing ones. This is a welcome feature, dramatically increasing the

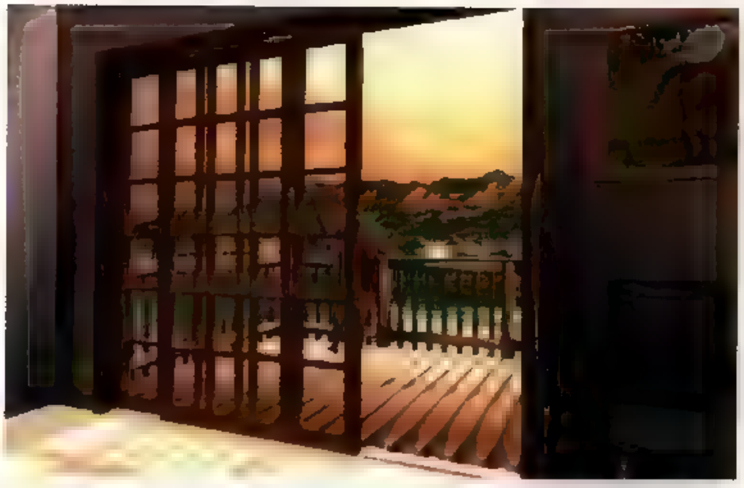


Users can create their own trees in *Bryce*'s Tree Lab, increasing the versatility of the plants. Simply start with a preset and amend the settings, or generate your own species from scratch

RELATED PRODUCTS
- *WorldBuilder Pro 4*
  Reviewed: Issue 57
- *Vue 5 Esprit*
  Reviewed: Issue 59
- *MojoWorld 3*
  Reviewed: Issue 60



● While *Bryce 5.5* is inexpensive, you can still perform quite advanced technical operations, such as using conditional textures that vary by altitude and slope angle for more professional results



● Although much improved, the render engine is still slow. This is what eight and a half hours of processing on a pretty powerful PC gets you – soft shadows really increase render times

versatility of the plants, although we would have liked a larger (or resizable) preview window so that you could see the plant that you are designing that much more clearly.

Such limitations typify much of what is wrong with *Bryce*. The original program was designed with a 'concept' interface, which is to say that it doesn't conform to standard Windows interface rules. For example, while you can resize windows, the buttons aren't obvious, and nor are they labelled, which can make the software quite irritating to use. Because this kind of design is fundamental to the program, its successive owners seem reluctant to take on the task of fixing its many shortcomings.

FASTER RENDERS

However, one important issue that DAZ has addressed is *Bryce's* rendering engine. Depending upon the scenes you are rendering, you can apparently expect rendering up to 150 per cent faster than the previous version. While we only saw a speed improvement of about ten per cent in our tests, this is nevertheless still significant when your render time is hours per frame. DAZ says that render times will be reduced by the largest percentage on scenes with the simplest atmospheres and geometries, which seems to be a backwards way of doing things to us – you get the best performance gains where you need them the least!

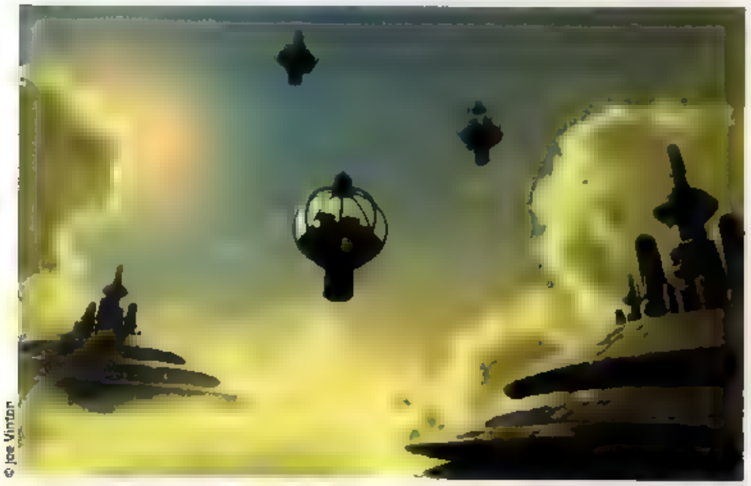
BRYCE 5.5 MAY BE NO VUE OR WORLDBUILDER, BUT IT'S CAPABLE OF CREATING HIGH-QUALITY STILLS

While *Bryce* has provided OpenGL support for a while now, this has now been extended to offer a number of new real-time display modes. The most valuable of these is the Textured mode, which provides a solid preview complete with very low resolution textures so that you can tell at a glance roughly which ones been used – although sadly it provides almost no useful information about water and volumetric textures.

Modelling has never been *Bryce's* strongest suit, although since version 5 the toolset has included Metaballs. However, the technology has been implemented at its most rudimentary level and you can't change the attraction strength. It's enough to add some new effects to your work but the capabilities could be more advanced.

But despite the *Bryce's* shortfalls, remember that the download version costs just $99.95! It offers extensive functionality and while it's no *Vue* or *Worldbuilder*, is more than capable of creating images that can compete with either app, albeit without advanced lighting or water. As a means of creating stills, *Bryce* is easy to use, versatile and has a great terrain editor. It lacks the clout to make it a tool for serious movie makers but at this price point you can't really be surprised ●

● Figure posing and texturing application *DAZ|Studio* now interfaces directly with *Bryce*, making a great combination for stills work



© Joe Vinton

● Basic materials can be applied to 'shading domains' or groups of polys, with colour, specularity and transparency. This is mainly designed for moving to and from *Carrara*

● OpenGL previews let you see roughly how textures will look, but could be more detailed

VERDICT

PROS
- Versatile and easy to use
- Inexpensive

CONS
- No character animation
- Non-conformist interface
- Rendering still very slow

RANGE OF FEATURES	7
VALUE FOR MONEY	10
OVERALL	9

Photoshop CS2

After all this time, what more can Adobe add to what is arguably the world's premier image-editing software?

BY MAT BROOMFIELD

DETAILS

PRICE
- Full versions £523 / $599 / €786
- Upgrade £144 / $149 / €298*

*Currency conversion (excluding VAT)

PLATFORM
PC / MAC

MINIMUM SYSTEM
PC
- Windows 2000 SP4 / XP
- Pentium III
- 384MB RAM

Mac
- OS X 10.2.8
- Power Macintosh G3
- 384MB RAM

MAIN FEATURES
- Superb photo editing
- Make and view HDR images
- Smart Objects for cloning and non-destructive editing
- Vanishing Point perspective editing

DEVELOPER
Adobe

WEBSITE
www.adobe.com

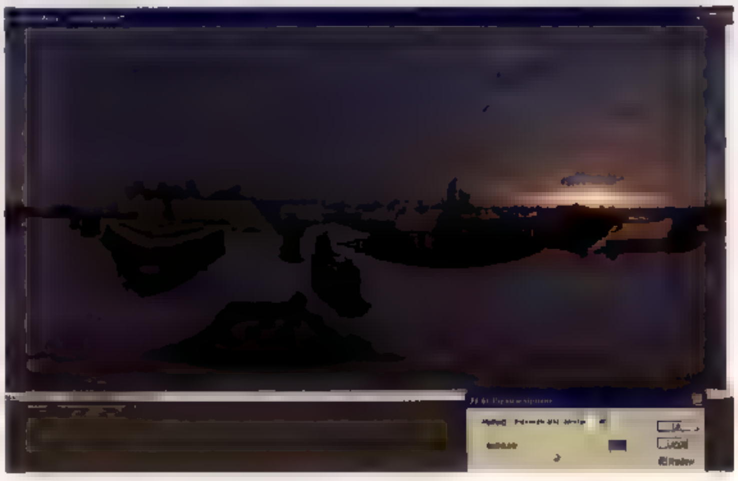
RELATED PRODUCTS
- *Paint Shop Pro 9*

Website www.corel.com

Photoshop has been around for more than 20 years, so you'd think that the really obvious features would have been implemented by now. Well, you'd be wrong. The latest version of *Photoshop* (*CS2*) addresses a couple of these inadequacies, and adds a surprisingly generous selection of innovative new features. One addition that's been long overdue, and which raised a cheer in the office, is live font previewing. When you select the drop-down font list, a small preview of each one appears beside its name. It's so simple, and every other package has done it for ages, but it makes a huge difference to many people's workflow

The value of *Photoshop's* other new features will vary according to the way you use the program and what you use it for. Do you want to clean up existing photos for use as textures, bump maps and backgrounds, or will they be more creatively processed for use as posters, web imagery, marketing material and animation?

Updates to the previous version of *Photoshop* seemed to be primarily aimed at digital photographers, but *Photoshop CS2* provides features that are much more to do with the creative use of photographs and other graphic materials.



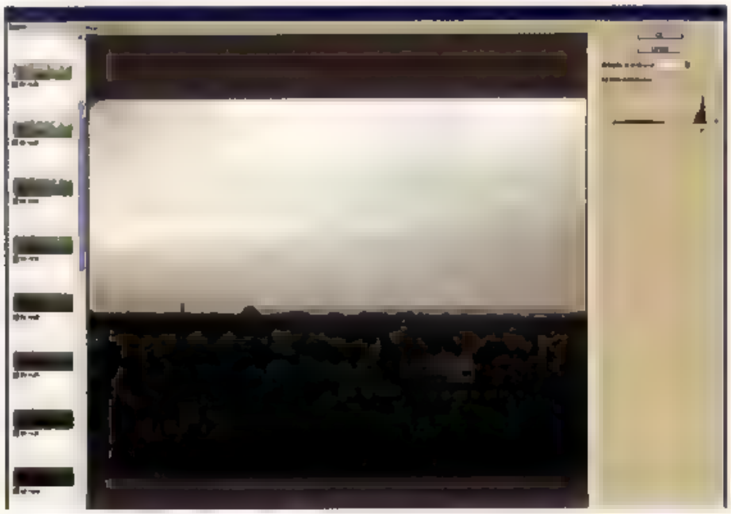
● You can specify the way *Photoshop CS2* displays HDR images. The Merge to HDR function will prove invaluable to anyone wishing to improve varying light conditions using multiple instances

For instance, the new Vanishing Point tool enables you to specify the plane in which you want to work, and will then adjust all other tools accordingly. Imagine, for instance, that you have a photograph of the corner of a building, with the two sides receding into the distance on either side. Now imagine that you want to clone stamp brickwork from one of the walls to cover graffiti. In the past, re-scaling within the plane was a tedious and complex process but now you can cut and paste within the plane and the correct perspective will be applied to the copied brickwork. Moreover, if you copy brickwork from another plane (perhaps one that's directly facing the camera), it will be appropriately adjusted when you move it into the receding plane. The Perspective tool can do so much more than this, too, and it's ideal for retouching background imagery.

HDR HIGHLIGHTS

For 3D artists, the most useful new additions are likely to be the support for HDR images. *Photoshop CS2* enables you to import and edit 32-bit HDR images, but like its 16-bit support, you can still only use a subset of the program's tools in these high-bit formats. We're not entirely sure why the program is limited like this, but with the increased memory and floating-point capabilities of the new generation of 64-bit processors, *Photoshop CS2* should be capable of offering a complete set of editing tools in all bit modes.

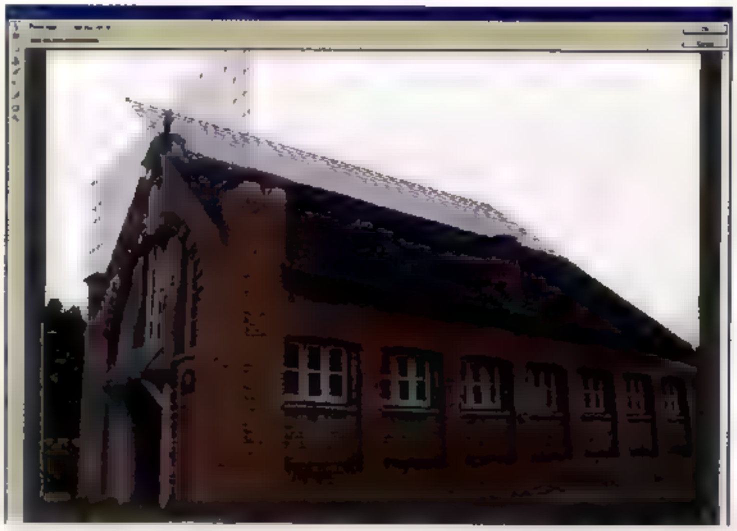
In addition to loading ready-made HDR images in most of the popular file formats, *CS2* offers a new Merge to HDR option that you can use to composite your own HDR images from a series of images taken at different exposure settings. Furthermore, the program also includes options to improve the on-screen display of 32-bit images. By their very nature, such images include content that's beyond the normal



● With *Photoshop CS2*, you can combine a series of images taken at different exposures to create your own High Dynamic Range image, but make sure you have plenty of RAM and a fast processor

gamut of the screen, but you can choose one of two modes to compensate. Highlight Compression simply reduces the brightness of the highlights, while Exposure and Gamma enables you to compress the entire dynamic range. Furthermore, because this setting offers a live preview, it's a good way to preview your image's appearance at various exposure levels.

When it comes to choosing images to create your HDR, you can select them via *Photoshop's* Automate selection, or via the new *Bridge* program. *Bridge* is an extensive standalone file viewing and management application that makes it easier to browse, organise and select images than ever before. It enables you to preview and load graphics content from any of the Adobe applications, such as *Photoshop*, *Illustrator* and *Acrobat*, and enables you to label and examine them in versatile ways.



● One of the more impressive enhancements to *Photoshop* is the new Vanishing Point filter, which enables you to use a subset of tools in full perspective

SMART CONTENT

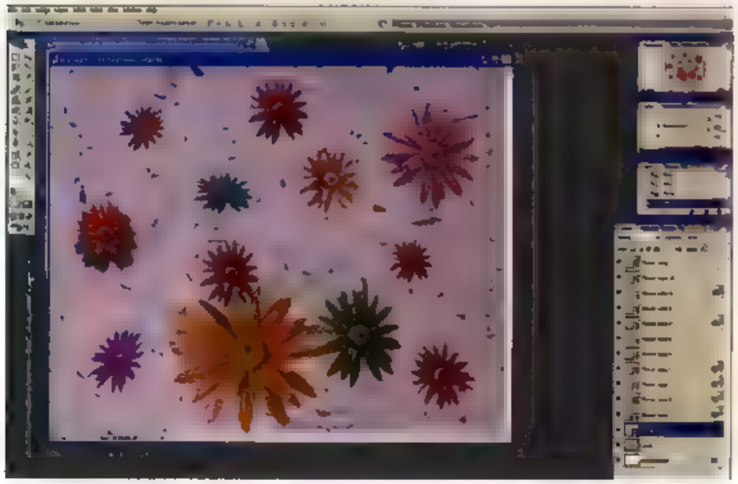
When it comes to creating content, the new Smart Objects feature is an innovation that can save hours. It allows you to create object holders that will non-destructively manipulate their contents. Furthermore, you can create multiple adjusted instances of Smart Objects, each of which is automatically updated when you change the master. (For example, if you're creating a pebble beach texture and you plan to duplicate, resize and re-orient a single pebble lots of times.) In previous versions of *Photoshop*, as soon as you reduce the size of the pebble, pixel information is irretrievably lost unless you go back and duplicate the original again. Also, if you decide that you want every pebble to be a different shape after positioning hundreds of copies, you'd have to manually edit each one or re-copy them. With Smart Objects you can simply change the master pebble and all the instances will update. When you resize the copies, the underlying image data is retained, and it's merely the visible appearance of that data that's modified. And if you import *Illustrator* vector shapes as Smart Objects, the program retains a live link with the *Illustrator* file. As a result, if you subsequently modify the file in *Illustrator*, the *Photoshop* image will be updated automatically.

WHEN IT COMES TO CREATING CONTENT, THE NEW SMART OBJECTS FEATURE SAVES HOURS

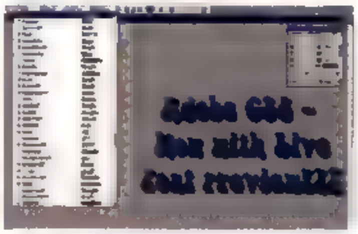
HIGH FIDELITY

If you're using *Photoshop* to produce TV-targeted material such as DVD menus or movie stills, you'll appreciate the new Video Preview option, which enables you to display your graphics on a separate video monitor. If absolute fidelity is important to you, perhaps for architectural visualisation, you'll find the new lens correction features invaluable. These options enable you to correct the common types of distortion that are caused by imperfect camera lenses. As a result, you can remove barrelling and pin-cushion effects, as well as perspective distortion and even colour noise.

There are so many new features and tweaks, both great and small, that it's impossible to cover them all in the space of this review. Suffice to say that whether you use *Photoshop* solely for its 2D capabilities or as an essential part of your 3D workflow, the latest version has many valuable enhancements that make it without doubt the best new *Photoshop* in years. ●

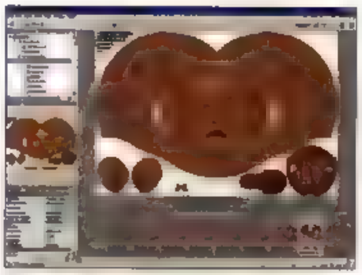


● Smart Objects are remarkable, enabling you to create multiple instances of a master object and adjust each independently. Make a change to the master and the change is reflected in all clones



● At last … live font preview within *Photoshop*! We've waited years for this simple inclusion

● Spot Heal is ideal for times like this where you just want to erase a small blemish without the hassle of setting up a clone source



● *Bridge* is much more than a mere image viewer, though it still falls a long way short of programs such as *ThumbsPlus*

● The enhanced Warp tool enables you to quickly and easily distort your images so you can wrap them around other 3D shapes

VERDICT

PROS
- Smart Objects are a revolution
- Greatly increases productivity
- Supports HDR images
- Vanishing Point is superb

CONS
- Many interface changes to be learned

RANGE OF FEATURES	9
VALUE FOR MONEY	8
OVERALL	9

DETAILS

PRICE
- Full product
  £128* / $229 / €189*
- Upgrade (from version 4)
  £44* / $79 / €65*

*Currency conversion

PLATFORM
PC / Mac

MINIMUM SYSTEM
PC
- Windows 98 / 2000 / NT / XP
- 600MHz
- 128MB RAM

Mac
- Mac OS X 10.2
- 400MHz
- 128MB RAM

MAIN FEATURES
- Export layered 3D renders directly to *Flash*
- Huge speed improvements with the *RAVIX 4* engine
- Rapid workflow using drag-and-drop libraries
- Create complex models using advanced modeller
- Improved outline shadow and outline tools
- Output directly to *QuickTime*, AVI and *Flash* video (FLV)

DEVELOPER
Electric Rain

WEBSITE
www.erain.com

Swift 3D 4.5

The novel vector rendering 3D application gets an interim update, but is it enough to satisfy loyal users and novices alike?

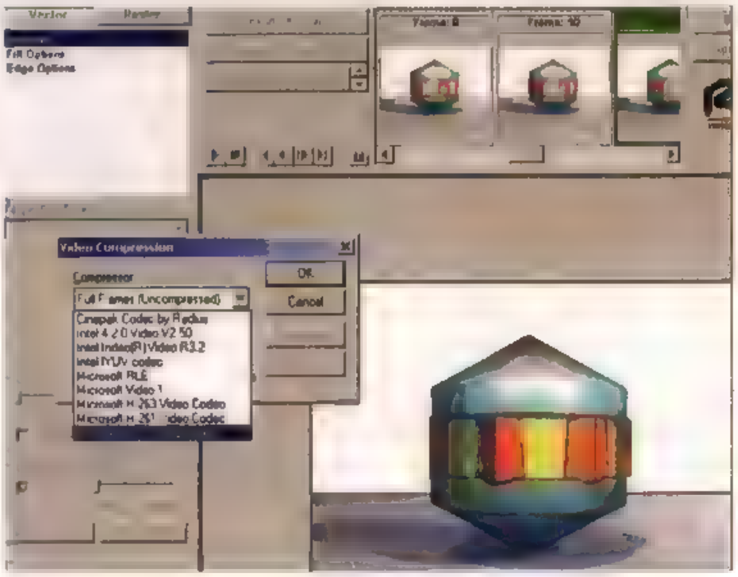
BY SIMON CORNISH

Open *Swift 3D 4.5* and you'd be forgiven for thinking that nothing has changed. The twin viewports, lighting and object rotation balls, animation timeline and properties panel are still there. The drag-and-drop preset libraries for animation, materials, objects and so on, are unchanged

The same goes for the three modelling editors for extrusion, latheing and the newer advanced modeller. In fact, most of these workflow enhancements were created or updated in the original release of *Swift 3D* version four. What wasn't updated from version three was the underlying render technology.

So it's only when you jump into the preview and export editor that you notice that the badge at the top right now says '*RAVIX 4*'. But what does this mean to the average *Swift 3D* user? Well, a 50 per cent speed increase on some renders, for a start - which alone warrants the '.5' update. Electric Rain has also included some of the other goodies with the improved render engine that first appeared in its recently updated *LightWave* and *3ds Max* vector output plug-ins. This update is, in effect, the major overhaul of the vector rendering engine that was lacking in the original version 4 release.

The edge rendering now includes some elegant pen settings, which give control over nib width and angle. The shape can also be switched between a hard edged rectangle or a smoother ellipse. Edge lines can now be set to appear at intersections, and there's now an option to set edge lines to appear as slightly softened when viewed through transparent surfaces.



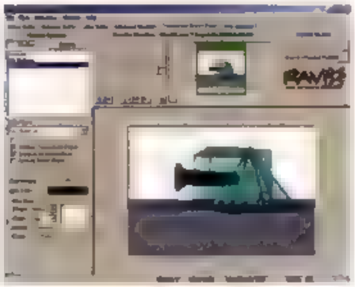
● **Animated sequences within *Swift 3D 4.5* can be rendered directly to a range of formats, including *QuickTime*, AVI, or the new *Flash* FLV formats**

LIMITED MODELLING

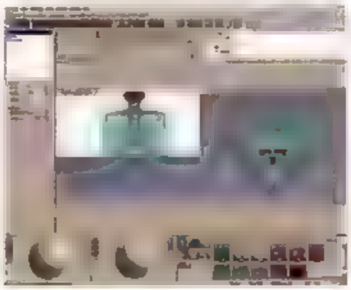
Also incorporated with the fill options are more extensive controls for shadow colour and density. Improved level three *Illustrator* output capabilities can be selected under the vector output settings, and both the vector and raster renderers can now create *QuickTime* and AVI movies as well as output to the new *Flash* FLV video format to play directly in *Flash*. It's also possible to save your render settings to be re-used in other projects.

While *RAViX 4* is a huge improvement to the speed of the package, this isn't a free upgrade. If you use the software regularly it will be a worthwhile bonus, but if you only use it occasionally it will probably be wise to hold out until you really need the extras that it offers. Although a worthwhile update, longstanding users may find some limitations of the modelling environment and bemoan the lack of mesh deformation tools in animation. Electric Rain would also have done well to update the ageing EMO raster engine, which now appears a tad on the slow side when compared to the *RAViX* output. Although, to be fair, this is not really where *Swift 3D* is at anyway.

New users, particularly from the field of web design, will still find *Swift 3D* an easy-to-learn 3D package that gives knock-'em-dead results for *Flash* projects. ●



● **The new and improved *RAViX 4* engine provides greater control over edge lines with the new pen tool**



● **The easy-to-use interface, retained from version four, enables novice users to find their way around, improving overall workflow**

RELATED PRODUCTS
- *VectorStyle 2*

Reviewed: Issue 68

VERDICT

PROS
- Range of output options
- Fast vector rendering

CONS
- Some limitations for sophisticated work
- Not a free upgrade

RANGE OF FEATURES	**8**
VALUE FOR MONEY	**9**
OVERALL	**8**

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HDRfinish V1

If you want to create, edit or simply view HDR images, here's an inexpensive yet versatile program that will help you do it all

BY MAT BROOMFIELD

DETAILS

PRICE
- £66* / $119 / €99

*Currency conversion

PLATFORM
PC

MINIMUM SYSTEM
- Windows 2000 / XP

MAIN FEATURES
- Convert HDRI panorama formats
- Image viewer
- Assemble 24 bit photos into a HDRI
- Selectively add image data to the HDRI
- Convert between HDRI file formats

DEVELOPER
Dosch Design

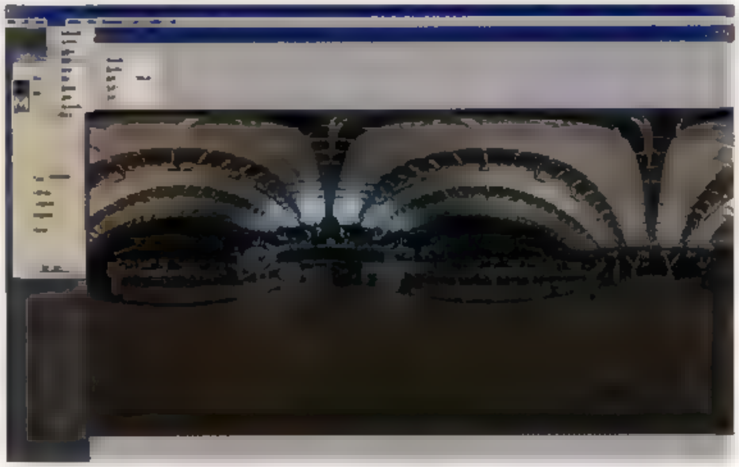
WEBSITE
www.doschdesign.com

No other lighting method more accurately illuminates your 3D scenes. The only trouble is, you can't properly manipulate High Dynamic Range images using standard photo-editing software. *HDRfinish V1* is one solution.

Let's establish one thing straight away. *HDRfinish V1* isn't photo-editing software. Its interface is minimal, and it has almost no editing tools. The program's greatest strengths are its ability to convert between HDRI map formats, and the fact that it enables you to assemble a collection of images into a single HDR image.

There are a number of different HDRI mapping formats, and if you need the ability to repurpose your images for different rendering environments, it couldn't be easier. Select the 'Convert any to any' option – the program automatically selects the correct source format, leaving you to choose the destination format. If you want to, you can also resize the destination image at this stage.

HDRfinish V1 also includes an image viewer. The program supports nine image formats, including 24-bit formats such as JPG and BMP, and HDR formats such as EXR and HDR. Once you've loaded an image, you can view its appearance under various exposure settings using the EV slider, which essentially matches the f stops on a camera. This enables you to move from -10 to +10 – that is, 50 percent less than the maximum exposure range supported by the EXR image format, which has a 30 f-stop range. However, it should be more than enough for all practical purposes. You can also view the image at various gamma settings, which alters the relationship between highlights and shadows.



● *HDRfinish V1* **doesn't offer users the most ergonomically designed interface in the world, but it earns its keep as an image viewer and converter, effortlessly converting between mapping formats**

INTERFACE ISSUES

You can copy images from the viewer, and by altering their exposure and gamma settings, the images can subsequently be assembled to create your own HDR image. This is useful if you're trying to manually create HDR images from 24-bit photographs. You can also create your own HDR by loading a series of images and combining them. Whichever route you follow, the images must be reassembled in order of exposure, from brightest to darkest, and it would be far easier if the program provided you with image previews so that you could see what you were including.

You can load alpha channels, and these can be used to select image elements to be combined into the final HDR image. Again, it wouldn't have hurt to provide selection tools directly within the program. In general, this program feels like it was designed by a scientist, and one who hasn't seen a modern user interface. As such, it's often unnecessarily complicated.

For example, in most software, cropping an image to a rectangle isn't difficult – you drag a marquee around the area to be cropped, resize using handles if necessary, then crop. That's the conventional way of doing things. But in *HDRfinish*, you choose the marker toolbar and click to position markers. These become marquee corners. If you add lots of markers, the furthest out will be used. Then you choose Crop from the menu to crop the image.

HDRfinish V1 is inexpensive and earns its keep simply as a viewer and format converter. This is just as well, because the rest of the program, while very functional, isn't always much fun to use. ●

● *HDRfinish V1* **accepts all the common mapping formats, including JPG and BMP, plus HDR and EXR**

● **You can use *HDRfinish V1* to view HDRIs or to modify the exposure of LDR images, as demonstrated in this example**

VERDICT

PROS
- Easy way to convert between formats
- Good way to view different exposure settings

CONS
- Unfriendly interface
- Poor English and spelling in manual and program

RANGE OF FEATURES	**6**
VALUE FOR MONEY	**8**
OVERALL	**7**

RELATED PRODUCTS
- *HDR Shop*

www.hdrshop.com
- *HDRview*

www.sachform.de

VectorStyle 2

Eovia's proprietary vector rendering technology offers Carrara users tailored integration with Flash, EPS and Illustrator

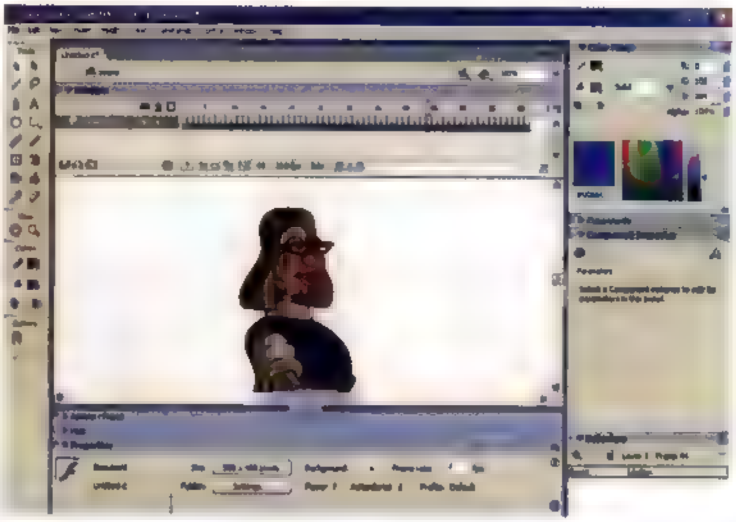
BY MIKE DE LA FLOR

The ability of 3D programs to render hyper-photorealistic images overshadows the fact that sometimes leaving something to the imagination is a good thing. Not only is there an inherent charm to flat colour line drawings, on the technical side, they tend to be smaller in file size. This is where *VectorStyle 2* comes in.

VectorStyle 1 for *Carrara* was based on RAViX technology licensed from Electric Rain, essentially the same technology used in Electric Rain's popular *Swift 3D* program. However, *VectorStyle 2* is proprietary technology developed entirely by Eovia. Currently, Electric Rain licenses its RAViX technology to Alias, and develops plug-ins for *3ds Max* and *LightWave*. This makes Eovia one of a handful of 3D software publishers (Maxon is another) that develops proprietary vector rendering technology.

HEAD TO HEAD

There is a general distinction between vector rendering programs such as *Swift 3D* and *VectorStyle* and most 'toon' renderers, such as *Toon!* for Carrara or *finalToon* for *3ds Max*. Whereas *Swift 3D* and *VectorStyle* take a 3D scene and output resolution-independent curves (vectors), the majority of 'toon' programs render resolution-dependent, pixel based images. The concept behind vector rendering of 3D scenes is quite simple. Programs such as *VectorStyle* analyse objects in a 3D scene to detect edges and areas of colour and convert that information into open and closed Bezier curves for integration into *Flash*, EPS and *Illustrator* formats.



● *VectorStyle* **does an excellent job at exporting 3D animation as 2D** ***Flash*** **animation, though some experimentation with the settings is often necessary to get satisfactory results**

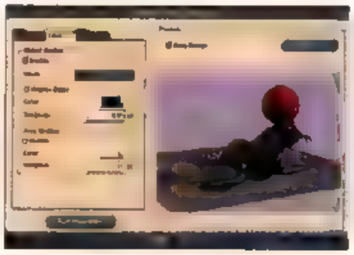
When rendering to vectors with *VectorStyle*, settings can be adjusted in four main option areas. Output, for global properties like file size; Common, for general curve quality; Lines, for stroke properties; and Fill, for colour mode, specularity and transparency. Options are self explanatory, but may require some experimentation to achieve results. When composing a 3D scene for vector rendering, simplicity is key. Stick to flat colours, and keep lighting and specular properties straightforward.

Swift 3D and *VectorStyle* are similar in their rendering options, though *Swift 3D* offers a few more amenities, such as *Flash* layers to separate animated from non-animated objects, Shadow Density and Pen Style outlines.

However, when it comes to rendering performance, *VectorStyle* consistently renders scenes faster. The speed difference is especially notable when the Shadows option is enabled. Vector output quality is comparable in both applications, which isn't always a good thing. The automated vector creation process from a 3D scene to a 2D vector file often creates unnecessarily complex curves with dozens of anchors, which frequently makes curves difficult to edit in programs such as *Illustrator*.

Overall, *VectorStyle* is easy to use, features a no-nonsense interface and offers a fast, automated rendering preview option. When compared with the standalone or plug-in versions of *Swift 3D*, *VectorStyle* holds its ground as a comprehensive vector rendering solution. There's no reason for *Carrara* users to buy *Swift 3D* ($229) when *VectorStyle 2* does the job for $129 ●

● *VectorStyle* **integrates well with** ***Carrara*** **and features advanced vector rendering options, such as 'reflections' and 'transparency'**



● *VectorStyle's* **interface contributes to its shallow learning curve. The 'preview' option makes visualising changes a cinch**

VERDICT

PROS

- Fast and easy to use
- Comprehensive vector rendering toolset

CONS

- No Pen Style line options
- No support for *Flash* layers
- No shadow density control

RANGE OF FEATURES	**8**
VALUE FOR MONEY	**10**
OVERALL	**9**

DETAILS

PRICE
- Full version £90 / $129 / €129
- Upgrade £28 / $39 / €39

Prices exclude VAT

PLATFORM
PC / Mac

MINIMUM SYSTEM
PC
- Pentium II 500MHz
- Windows 98SE / Me / 2000 / XP
- 256MB RAM

Mac
- Mac OS X 10.1
- Power Macintosh G3 450MHz
- 256MB RAM

MAIN FEATURES
- Shadows from multiple light sources
- Reflection and transparency
- Highlights from multiple light sources
- Improved render quality
- Output to EPS, *Flash*, AI, and SVG

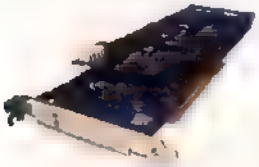
DEVELOPER
Eovia, Inc

WEBSITE
www.eovia.com

RELATED PRODUCTS
- *Swift 3D LW3*

Reviewed Issue 67
- *Swift 3D 4.5*

Reviewed Issue 68



PURE PCI-X

With twice the number of raytrace chips, and now boasting Mac support, is this redesigned render card twice as fast as its previous incarnation? **BY PETE DRAPER**

DETAILS

PRICE
- £2,899 / $5,560 / €4,420

PLATFORM
PC / Mac

MINIMUM SYSTEM
PC
- Windows NT / 2000 / XP
- Pentium 400MHz
- 512MB RAM

Mac
- Mac OS X
- Apple Macintosh G4 / G5
- 512MB RAM

OTHER REQUIREMENTS
- *3ds Max 5 / 6 / 7.x*
- *VIZ 4, 2005*
- *Maya 4.5 / 5 / 6 / 6.5*

MAIN FEATURES
- Hardware raytracing
- Redesigned architecture
- 16 AR350 raytrace chips
- Fast HDRI rendering
- Windows and Apple Mac support

DEVELOPER
ART VPS

WEBSITE
www.artvps.com

A year has passed since ART VPS' last main release, and it's been a busy one. The new PURE raytracing card has double the number of chips, increasing the physical depth of the card and spilling over to a neighbouring PCI slot. You might think that render times would be halved but, unfortunately, this isn't the case. Our *3ds Max* test scenes, which worked through PURE's large gamut of features, averaged about 70-75 percent of the render time taken on an 8-chip card. This may sound disappointing, but when you consider that the price of the 16-chip card is about 75 percent of the price of two 8-chip cards, it works out about right.

However, while render times have improved, most of the *3ds Max* integration via the *RenderPipe* plug-in has not. This is disappointing, given that many of the issues were raised in earlier *3D World* reviews. *3ds Max* scenes will still have to be reworked to get the most out of PURE, including changing light types and cameras. There are scripts to do this, which come with the installation, but instancing is still not maintained, which results in light copies being turned off with the first light turned on. A simple light-type amendment would be preferable (for example, changing from Spot to RPLight). The same applies for RPCameras – you have to create new cameras to benefit from the *RenderPipe* features, such as accurate depth of field and motion blur (which, additionally, still doesn't support particle or object deformation motion blur). Fortunately, most of these points aren't deal breakers.

● Raw power: a scene like this, with over 1.5 million raytraced polygons, would take forever to render under software alone. PURE PCI-X rendered it out at print resolution in under 20 minutes

● *RenderMan* shaders can be used within *3ds Max* and rendered using PURE, with several being included with the software

We're just picking fault at the introductory software front-end, which is mainly designed to get new users to utilise *RenderPipe's* own items. All of these (small) workarounds fall by the wayside when you actually start rendering. The card raytraces quickly and leaves all software renderers trailing in the dust when it comes to speed.

PURE SPEED

The price tag may seem high for the average user, but when you consider that PURE PCI-X renders glass fragments and particles in their millions with true depth of field at broadcast resolution in a staggering 15 minutes (a software renderer took 120+ minutes per frame using an eight-machine distributed bucket rendering system), it begins to appear far more cost-effective, especially for design and broadcast studios. Any native *3ds Max* shaders that aren't supported, such as the Raytrace material or Ink 'n' Paint (which is built on the Raytrace material), can be bettered with PURE's own shaders and the infinite sea of *RenderMan* shaders that PURE can use.

Although the feature set hasn't changed since the last time we reviewed the card, with ART VPS playing catch up to support or match features in new versions of *3ds Max*, software updates for full radiosity will be available in about a month's time – which should be around the time you're reading this review. Render Elements (including diffuse and specular passes, and so on) should follow along shortly afterwards. ●

● A HDR image is handled within *3ds Max* as normal, the *RenderMan* light shader lights the scene instead of the standard Skylight

VERDICT

PROS
- Fast rendering
- Supports OS X (for *Maya* users)

CONS
- Undo doesn't work with *RenderMan* shaders
- No motion blur with particles

RANGE OF FEATURES	8
VALUE FOR MONEY	8
OVERALL	8

RELATED PRODUCTS
- *PURE*
Reviewed: issue 20 / 52

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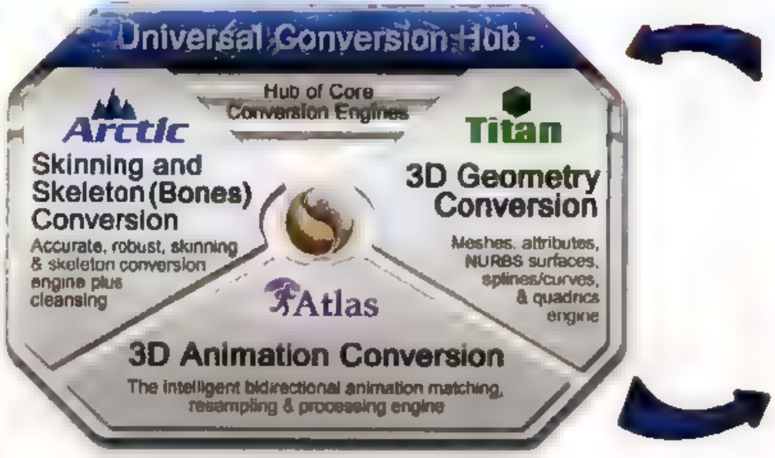

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- **Maya** — via PolyTrans-for-MAYA — .ma, mb, bdf
- **3ds max** — via PolyTrans-for-MAX — max, bdf
- **DirectX** — Microsoft DirectX Technology — .x
- **XSI** — SOFTIMAGE|XSI Modeler — dotXSI
- **FilmBox** — FBX file format — fbx
- **Autodesk** — Native DXF, DWG & Inventor — dxf, dwg, ipt
- **CATIA** — Native CATIA v4 & CATIA v5 — Many
- **IGES/SAT/STEP** — via PTC Granite Native Import — iges, sat, step
- **OpenFlight** — Industry Standard VisSim Import-Export — flt
- **Pro/E** — via PTC Granite Native Pro/E Import — asm, prt
- **SolidWorks** — via Direct Link or Native Disk Files — sldasm, sldprt

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Boris Rabin, Visualization Development Lead,
NASA/Ames Research Center, FutureFlight Central

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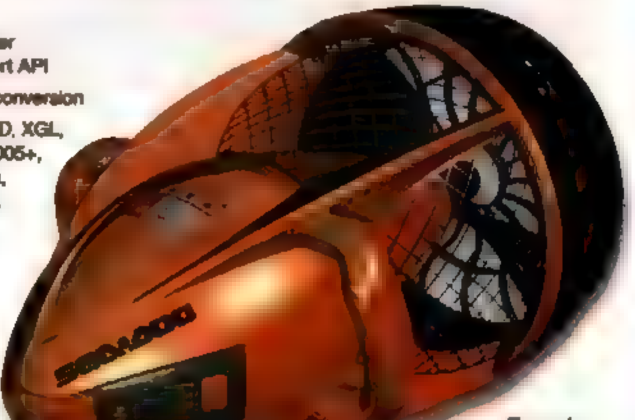

Example "CAD to D.C.C" conversion. SolidWorks to Maya. Converted and optimized by PolyTrans-for-Maya. © 2005, Designed and Manufactured by Dales Designs Ltd. Hong Kong.

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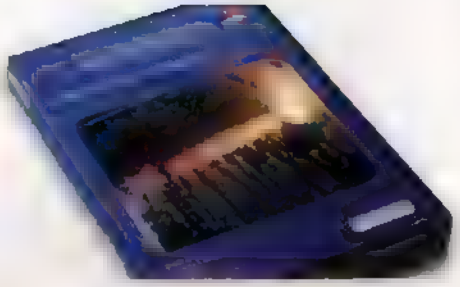
DETAILS

FOR
3ds max

PUBLISHER
CG Academy
www.cg-academy.net

PRICE
£129 / $233 / €193*
*Currency conversion

RUNNING TIME
18 hours



CG Academy – Particle Flow Fundamentals Set

Consisting of the five DVDs from the *Particle Flow Fundamentals* series (also sold separately), this set covers almost everything you need to know to get to grips with *Particle Flow*, and it even delves into basic operator scripting.

There could be more tutorial-orientated examples where scenes are constructed from scratch, instead of going through pre-built scenes, since you tend to learn better with 'hands on' experience. Having said that the instructor does disassemble most of the scenes, editing and amending them to illustrate the operator's features. And the quality of the content is very high, as is the quality of the, audio and video – you'll need a good screen resolution to play the disc at its native size.

Overall, this is a very good introduction and breakdown of *Particle Flow*'s features, and it's definitely something for new and intermediate users to get their teeth into.

VERDICT

More interaction would be useful, but this is still a comprehensive rundown of *Particle Flow* 8

DETAILS

FOR
3ds max

PUBLISHER
CG Academy
www.cg-academy.net

PRICE
£36 / $65 / €54*
*Currency conversion

RUNNING TIME
184 minutes

CG Academy – MAXScript Fundamentals 1

It's impossible to fault the tutor's approach to teaching first-time scripters on this disc. Each process is well thought out and designed, from introduction to conclusion. It's very informative and key details are reiterated whenever necessary.

You're introduced to the process of scripting with a real-world task. This is broken down so you get familiar with instructions and variables, before logically progressing onto more detailed features and tasks, without confusing any scripting novices with technical jargon.

As with the other CG Academy DVDs, audio and video quality are high, as is the screen resolution, so if you're following the practical part of each stage, the Pause button or another screen is recommended!

This is a superb example of how DVD training should be done and it's seriously worthwhile if you've always wanted to delve into scripting but were afraid to do so.

VERDICT

Trainer Laszlo Sebo's experience shines, and his teaching is calm, well paced and informative 9

DETAILS

[illegible]
SoftImage|XSI

PUBLISHER
The Gnomon Workshop
www.thegnomon
workshop.com

PRICE
£38* / $69 / €57* each
*Currency conversion

RUNNING TIME
Volume 1: 170 minutes
Volume 2: 240 minutes

Creature Design With Aaron Sims Vols 1&2: Designing With Photoshop, XSI and ZBrush

This two-disc set from The Gnomon Workshop aims to guide you through the process of creating 3D creatures, from a concept or sketch to a final 3D design.

While the content of each of these two discs is comprehensive, well designed and easy to follow, there are some areas where it would have been more beneficial if trainer Aaron Sims had gone into more depth with regard to technical issues. Rather than thoroughly explaining the specific features found in the different packages, the viewer is guided through each of the steps involved in the process of taking the various projects from start to finish. This begins at the initial design phase using *Photoshop*, leads into the creation of the 3D scene using *XSI*, *ZBrush* and *Deep Paint*, and then brings the images back into *Photoshop* for the finishing touches.

As an alternative to starting completely from scratch each and every time, Aaron carefully demonstrates how characters can be designed and built quickly (both human and alien-like) by making use of *XSI*'s Primitive Character as a starting point. The main theme can be summarised as getting up a fast and efficient workflow, only spending the time and effort that's absolutely essential at each step.

The pace is kept rather high throughout the two volumes, which enables a lot of ground to be covered in just under seven hours. The inevitable downside to this is that newcomers might have a hard time following each and every step without pausing or rewinding the discs.

The results achieved in the final images are certainly impressive and there's a lot to be learnt with regard to optimising your workflow. However, to get the most out of the material, you really need to be fairly familiar with the different packages that are covered on the discs.

VERDICT

A comprehensive set that takes you through all of the steps in the design process 8

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[illegible]

SIGGRAPH2005

Buyers' guide

Whether you want advice on choosing a specific software package, or an overview of what's on the market, this database of past 3D World reviews contains the information you need to make the right buying decision

Online Resources

● This guide lists prices in Pounds Sterling and US Dollars. For a quick currency conversion: www.xe.com

● For non-3D software, our new online portal holds a wide range of reviews: www.3dworldmag.com

When new 3D users contact the magazine, the most common question they ask is: "Which software package should I buy?" To which the honest response is: "That really depends on you."

Unlike Web design or 2D illustration, there's no single, well-established software package that all professionals use. Instead, choosing a 3D application is largely a matter of personal requirements, not to mention individual taste. Before you begin downloading demos, however, it does help to have a broad overview of what's available – and that's where this buyers' guide comes in.

In this guide, you'll find a list of the key software packages in a particular market sector, the issue of the magazine in which each one featured and a brief summary of the review. These summaries represent a single reviewer's opinion, but they should give you an idea of the key characteristics of each application.

QUESTIONS, QUESTIONS...

Before diving in, there are two fundamental questions you should ask. Firstly, are you pursuing 3D as a professional career? And secondly, what kind of 3D work do you aim to produce?

If the answer to the first question is 'no', the only limitations on your choice of 3D software are your budget and operating system. In the hands of a skilled user, inexpensive applications can generate impressive results, although they might not do so as quickly as more expensive software (or in a way that professional 3D artists would deem conventional).

If you do aim to make a living in 3D, however, you'd be well advised to pick a 'professional' application: those listed in the upper table on the page opposite. Expensive packages don't necessarily generate better results, but they tend to produce work quickly, flexibly and reliably – all important issues if deadlines are looming. And while studios don't usually hire staff solely on the basis of the software they've used, mastering a 'name' application will familiarise you with high-end tools and increase your chances of freelance work.

Another consideration is whether you intend to produce animations or still images. As a crude generalisation, illustrators and graphic artists often favour pro applications at the lower end of the price scale, while those working in animation, visual effects or game design tend to opt for more expensive packages.

Ultimately, however, there's no substitute for hands-on experience. All major applications have demo versions that you can download and experiment with, and before you reject the more expensive packages, remember that many of them – particularly *Maya, Houdini, LightWave* and *Softimage XSI* – have free 'learning' editions. Educational deals also offer students the chance to buy full versions of professional software for the price of a handful of DVDs: to see if you qualify, check the website of the software package you're interested in.

CHOOSING APPLICATIONS IS ALL ABOUT PERSONAL REQUIREMENTS AND INDIVIDUAL TASTE

Fortunately, there are very few 'bad' 3D packages on the market, so choosing the right one for you ultimately comes down to personal taste. Do your research, consult the magazine, and be prepared to experiment – but above all, enjoy yourself!

ALL-ROUND 3D PACKAGES (UNDER £250)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AIST MOVIE 3D		Cut-down version of *Realsoft 3D* aimed mainly at home movie makers dabbling in 3D	[illegible]	[illegible]	www.aist.com	[illegible]	[Not previously reviewed in 3D World]	**N/A**
CARRARA 3D BASICS	[illegible]	[illegible] cut-down version of a mid-price app, aimed at hobbyists and casual users	[illegible]	[illegible]	www.eovia.com	[illegible]	[illegible]	**N/A**
CARRARA 4 STANDARD	[illegible]	Inexpensive all-rounder lacking some of the [illegible]	[illegible]	[illegible]	www.eovia.com	[illegible]	Still a solid purchase for a novice all-round 3D user on a budget. [illegible] bugs from earlier versions, but lacks the new rendering tools of the *Pro* edition	**8**
GAMESPACE	[illegible]	[illegible] *trueSpace* with extra games tools aimed at [illegible] game developers	[illegible]	[illegible]	www.caligari.com	[illegible]	[illegible] community. But one with rough edges [illegible]	**7**
HASH ANIMATION:MASTER	[illegible]	Cult entry-price animation app chosen by [illegible] for personal work	[illegible]	[illegible]	www.hash.com	[illegible]	Powerful, intuitive rigging and animation package, complemented by a simple, versatile modeller. Now adds hair support and a spline-based particle system	**9**
PIXELS 3D	[illegible]	The premier [illegible] Mac-only 3D package [illegible] cult app amongst Mac users	[illegible]	[illegible]	www.pixelsdigital.com	[illegible]	[illegible] high-end tools including [illegible] good render quality, but very slow and workflow could be improved	**8**
REALSOFT 3D 4.x (FOR LINUX)	Linux	Even better value than the PC edition, most [illegible]	[illegible]	[illegible]	www.realsoft.com	[illegible]	Excellent render quality for the price, but more suited to still images than animation work, particularly character animation. OpenGL could be improved	**9**
SHADE 7 DESIGNER LE	[illegible]	Very inexpensive [illegible] all-round package extremely popular with hobbyists in Japan	[illegible]	[illegible]	www.curiouslabs.com	[illegible]	Clearly geared towards the student or amateur, this cheap and cheerful version of its bigger siblings shares the basic modelling tools, but is otherwise limited	**7**
SHADE 7 STANDARD	[illegible]	[illegible]	[illegible]	[illegible]	www.curiouslabs.com	[illegible]	[illegible] toolset to the *Professional* edition but lacks automatic smoothing and interpolation. A reasonable buy if you can handle the translation issues	**7**

ALL-ROUND 3D PACKAGES (OVER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3DS MAX 7.5	PC	[illegible] established [illegible] package [illegible] standard in the games and architecture industries	[illegible]	Autodesk	www.autodesk.com	[illegible]	A second point release – although only available to subscribers – 3ds Max 7.5 adds hair and fur, architectural features and better mental ray rendering	8
CARRARA 4 PRO	Mac/PC	Inexpensive all-round app now targeted more specifically at professional illustrators	£419 ($579)	[illegible]	www.eovia.com	[illegible]	Retains Eovia's unique – and possibly offputting – system of workflow divided into rooms, but dramatically improves animation and high-end rendering	8
CINEMA 4D 9 BASE	Mac/PC	Entry-level edition [illegible] important tools must be purchased as add-on modules	[illegible]	Maxon	www.maxon.net	[illegible]	Not as [illegible] upgrade [illegible] but builds on previous [illegible] package	9
CINEMA 4D 9 XL	Mac/PC	A powerful renderer makes this increasingly respected app the choice of many illustrators	£1,148 ($1,895)	[illegible]	www.maxon.net	[illegible]	This edition not specifically reviewed in 3D World. Pricier than LightWave, but the MoCA and Advanced Render modules are essential to many pro artists	9
CINEMA 4D 9 STUDIO	Mac/PC	Top-level edition [illegible] adding [illegible] and [illegible] rendering	[illegible]	Maxon	www.maxon.net	[illegible]	This edition not specifically reviewed in 3D World. Primarily for large facilities needing [illegible] although BodyPaint is a useful added extra	9
EIAS 5.5	Mac/PC	Perennial [illegible] high-quality animation package with a strong cult following	£453 ($835)	[illegible]	www.eitechnologygroup.com	[illegible]	Still an insanely fast rendering and animation package, but now minus a built-in modeller since the last – admittedly thorough – point release	8
HOUDINI 7 SELECT	[illegible]	Entry-level edition primarily aimed at studios [illegible]	[illegible]	Side Effects Software	www.sidefx.com	[illegible]	[illegible] A good additional seat for a Houdini studio, but lack of [illegible] animation tools limit its use as a standalone package	7
HOUDINI 7 MASTER	[illegible]	Powerful procedural animation package: few skilled users, but a staple of much VFX work	£8,760 [illegible]	Side Effects Software	www.sidefx.com	[illegible]	(Reviewed at version 6) Retains all the power of previous versions, but makes considerable advances in terms of ease of use. Also adds [illegible] rendering	8
LIGHTWAVE 3D 8	Mac/PC	[illegible] package used in a wide range [illegible]	[illegible]	NewTek	www.newtek.com	[illegible]	[illegible] workflow [illegible] problems of the app [illegible]	8
MAYA 6.5 COMPLETE	Mac/PC/ Linux	[illegible] some high-end tools [illegible] affordable version of Maya for many [illegible]	[illegible]	Alias	www.alias.com	[illegible]	[illegible] the one to beat in many fields of 3D, but although much faster and slicker many felt that Maya's last point release lacked [illegible]	7
MAYA 6.5 UNLIMITED	[illegible]	[illegible] powerful [illegible] package [illegible]	[illegible]	Alias	www.alias.com	54	[illegible] but it's not exactly a perfect upgrade – it feels like half an improvement. Artists on a budget may want to wait for Maya 7	7
REALSOFT 3D 5 (FOR PC)	[illegible]	Underpublicised but well-regarded [illegible] application, good built-in renderer	[illegible]	Realsoft [illegible]	www.realsoft.com	[illegible]	Enhanced Sub-D modelling and texturing make this a viable alternative to better-known 3D illustration apps. Still weak in areas of animation, however	9
SHADE 7 PRO	Mac/PC	[illegible] package [illegible]	[illegible]	[illegible]	www.curiouslabs.com	[illegible]	Robust modelling tools and a reasonably powerful renderer, but the interface [illegible] unconventional to many western 3D artists	7
SOFTIMAGE XSI 4 FOUNDATION	[illegible]	Aggressively marketed entry-level edition of a leading 3D app: very powerful for the price	£399 ($495)	Softimage	www.softimage.com	[illegible]	Fuller featured than many entry-level editions of [illegible] packages, Foundation [illegible] sets a new benchmark for 3D software pricing	9
SOFTIMAGE XSI 4 ESSENTIALS	[illegible]	Powerful [illegible] package [illegible]	[illegible]	Softimage	www.softimage.com	[illegible]	[illegible] upgrade to a powerful package, adding new rigid-body dynamics, a fully [illegible] and materials tools	9
SOFTIMAGE XSI 4 ADVANCED	[illegible]	[illegible] for market dominance [illegible] Maya	£4,495 [illegible]	Softimage	www.softimage.com	[illegible]	For power users [illegible] Advanced also throws in [illegible] [illegible] for free [illegible]	9
STRATA 3D CX	Mac/PC	[illegible] package now targeted at illustrators	[illegible]	Strata	www.strata.com	[illegible]	A capable [illegible] package for a [illegible] looking to [illegible] Photoshop and Illustrator [illegible] 3D. Far weaker [illegible], however	7
TRUESPACE 6.6	[illegible]	Another fixture in the increasingly [illegible]	£319 [illegible]	Caligari	www.caligari.com	[illegible]	Improving animation and dynamics, version 6.6 addresses many of trueSpace's [illegible]	8

SIGGRAPH2005

TALKING POINT | No sleep 'til SIGGRAPH

YOU DON'T HAVE to be Nostradamus to predict that major upgrades to many of the software packages above will be announced some time at the start of August. To be more specific, some time on Tuesday 2 August, when the doors open to the exhibition floor at SIGGRAPH 2005. The show has always been the 3D industry's platform of choice from which to promote new software, and while Alias and Softimage both chose to announce at NAB in 2004, SIGGRAPH looks likely to be their centre of attention again this year. Although the details are still closely guarded, a glance at previous release schedules suggests that announcements from Side Effects and Autodesk – to name but two – are also due.

www.siggraph.org/s2005

TEXTURING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BODYPAINT 3D 2	Mac/PC	Powerful [illegible] 3D painting package [illegible]	[illegible]	Maxon	www.maxon.net	47	Much quicker and simpler to use than the first release and [illegible] well documented, but one for specialist [illegible]	9
DEEP PAINT 3D 2	PC	Established 3D painting app, but not recently updated, and losing headlines to BodyPaint	£307 ($595)	Right Hemisphere	www.righthemisphere.com	[illegible]	Powerful but RAM-hungry, and advanced mapping tools are presented in a separate app, Deep UV. Not recently updated, however, unlike BodyPaint 3D	8
PAINT SHOP PRO 9	PC	Inexpensive 2D painting and bitmap editing app, unfairly regarded as just for hobbyists	[illegible]	Corel	www.corel.com	57	Fantastic value for money, and version 9 adds a proper History palette. Does nearly anything that Photoshop can, but needs better alpha channel support	9
PHOTOSHOP CS	Mac/PC	The de facto standard for texture painting [illegible]	£515 [illegible]	Adobe	www.adobe.com	48	[illegible] de rigueur for professional 3D work. Few must-have features for 3D users in [illegible]	8

MODELLING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AMAPI DESIGNER 7	Mac/PC	Long-established modelling package boasting a unique workflow and interface	£339 ($479)	Eovia	www.eovia.com	40	A powerful modelling package particularly for organic objects, although user [illegible] could be improved	9
AMAPI 7.5 PRO	Mac/PC	Amapi Designer's new bigger sibling, intended as a serious alternative to pricier applications	£558 ($779)	Eovia	www.eovia.com	62	Professional version of Amapi aimed at industrial modelling. Superb dynamic geometry and better NURBS modelling but toolbars [illegible] validator is tricky	9
AMORPHIUM 3	Mac/PC	Blob-based modelling package, very popular with hobbyists but not recently updated	£76* ($149)	E Technology Group	www.e[illegible]group.com	35	A unique digital modelling package: its basic sub-D tools, a slow renderer and a rather [illegible] interface but what it does do it does [illegible] well	8
FORM•Z 5	Mac/PC	Powerful long-established all-round modeller used on a wide range of industrial projects	£794* ($1,495)	AutoDesSys	[illegible]		This is a premium modelling package: a hybrid solid and surface modeller with strong NURBS tools and decent renderer. It has a steep learning curve	8
MODO	Mac/PC	Powerful customisable and Mac-friendly new Sub-D modeller created by ex-NewTek staff	£459* ($695)	Luxology	www.luxology.com	60	A relatively [illegible] vector but one with a uniquely customisable modular design. Some [illegible] but improving quickly	8
RHINO 3	PC	Another well-established app at the lower end of the price scale for industrial modellers	£462* ($895)	Robert McNeel & Associates	[illegible]	[illegible]	New NURBS tools and shading modes make this package a strong all-rounder. Will soon need upgrading to keep pace with newer competitors, however	8
SILO	Mac/PC	New specialist Sub-D modelling package, inexpensive and improving with every build	£56* ($[illegible])	Nevercenter	www.nevercenter.com		Has evolved into a [illegible] modelling app, following early stability issues. Quirky UV mapping, but good crossover between Sub-D and poly tools, and [illegible] usable	9
ZBRUSH 2	Mac/PC	Powerful intuitive organic modelling package [illegible]	£2[illegible]	Pixologic	[illegible]	[illegible]	A new interface helps redefine ZBrush 2 as a professional 3D sculpting tool [illegible]	9

CHARACTER AND FACIAL ANIMATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
DAZ|STUDIO	Mac/PC	Long-awaited new rival to Poser currently still available as a free public beta	Free	DAZ Productions	www.daz3d.com	N/A	[Not previously reviewed in 3D World]	N/A
ENDORPHIN 2	PC	Innovative motion synthesis system using AI actors to generate artificial mo-cap data	£7,995 ($12,795)	NaturalMotion	[illegible]	[illegible]	Brilliant, technically accomplished and fun to use to boot. Generates data no real-world stuntman could achieve. Uses unique AI-powered virtual stuntmen	9
FACESTATION 2	PC	Turn video footage of an actor's face into instant animation for 3ds Max and Maya	£1,041* ($1,995)	Digimation	www.digimation.com	33	Fast facial tracking and [illegible] work with real-time [illegible] however and the quality [illegible] targets	8
LIFESTUDIO:HEAD 2.5 STANDARD EDITOR	PC	Customise a pre-built head model, apply instant lip synch and export as [illegible] or an AVI	£310 ($599)	LifeMode Interactive	[illegible]	44	Good texturing tools, but some tweaking is required to finesse the lip synch generated automatically from an audio track. Manual also need tidying up	8
LIFESTUDIO:HEAD 2.5 PRO ARTIST	PC	Create and rig facial models for 3ds Max and Maya, then apply instant lip-synching	£390 ($[illegible])	[illegible]	www.lifemi.com	44	As the Standard Editor but with the power to import/export directly to Maya or 3ds Max. One of the first proper tools of this kind: a time saver for games an[illegible]	8
MESSIAH:ANIMATE 5	PC	Powerful standalone animation package, also available as a plug-in for major 3D packages	£12[illegible] ($2[illegible])	pmG Worldwide	[illegible]		[Reviewed at version 3] A comprehensive character animation solution with very fast IK and deformation and powerful expressions. Now reduced in price	8
MESSIAH:STUDIO 2	PC	messiah:animate's larger parent product adding in full rendering capabilities	£5[illegible]* ($995)	pmG Worldwide	www.projectmessiah.com	58	[illegible] but offers [illegible]	7
MOTIONBUILDER 6 STANDARD	Mac/PC	Innovative 'motion design' package originally developed by Kaydara now owned by Alias	£532* ($995)	Alias	[illegible]	[illegible]	[Reviewed at version 5] Powerful FK/IK blending and real-time playback, plus a new Story window to keep things organised. Quickly becoming indispensable	9
MOTIONBUILDER 6 PRO	Mac/PC	Pro motion-editing app, an industry standard for blending mo-cap and keyframe data	£2,314* ($4,[illegible])	Alias	www.alias.com	62	[illegible]	8
POSER 6	Mac/PC	The original figure posing application, also used for pre-viz and simple animation work	£15[illegible]	[illegible]	[illegible]	[illegible]	Despite a few niggles, well-chosen workflow enhancements and a lot of new content make [illegible]	8

RENDERING (packages previously reviewed in 3D World only)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ART•LANTIS 4.5	Mac/PC	Old-school architectural rendering package now awaiting an update to version 5.0	£349	Abvent	www.abvent.com	13	This [illegible] package is capable of high-quality results and provides [illegible] and not recently updated	7
BRAZIL R/S	PC	Powerful 3ds Max renderer used in both stills and effects work, soon to be ported to Maya	£617* ($1,200)	SplutterFish	[illegible]	[illegible]	Fast and robust with an excellent shader system delivering high-quality results. Bucket rendering allows fast distributed rendering across a network	9
FINALRENDER STAGE-1	PC	Another powerful 3ds Max renderer often used in architectural visualisation work	£[illegible]* ($[illegible])	Cebas	www.finalrender.com	43	Powerful new HyperGI engine and caustics too, but exceptional results require a lot of tweaking. Some instabilities, particularly in distributed renders	7
TURTLE	Mac/PC/[illegible]	Third-party Maya renderer designed to offer a new balance of speed and image quality	£619* ($[illegible]99)	Illuminate Labs	[illegible]	55	Blisteringly fast raytrace rendering. Currently best suited to architectural work [illegible] developing rapidly	7

Swift3D
eovia

TALKING POINT | Toon in, drop out?

TOON-STYLE RENDERING was the talk of 2002. Now everyone's doing it. In addition to the cel shading options in the major 3D packages, users intent on a cartoon look to their renders can also pick up specialist plug-ins, such as Eovia's *VectorStyle 2*, or standalone rendering apps like *Swift 3D*. But which one is right for your needs? ***Swift 3D 4.5*** **is reviewed on page 90** ***VectorStyle 2*** **is reviewed on page 93**

LANDSCAPE GENERATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BRYCE 5	Mac/PC	The original landscape generator now back in development after several years in limbo	£38* ($69.95)	DAZ Productions	bryce.daz3d.com	16	Often dismissed as a toy for hobbyists, *Bryce* is easy to use and renders at high quality. Good for photorealistic backgrounds, even with the slow renderer	8
MOJOWORLD 3	Mac/PC	Unusual landscape-generation app with a unique emphasis on creating entire planets	£103* ($199)	Pandromeda	www.pandromeda.com	[illegible]	A unique approach to landscape generation that tends to polarise opinion. Great tools, but hard to control fine details and the interface can be frustrating	6
VUE 5 ESPRIT	Mac/PC	Landscape generation's current market leader: high-quality results at an affordable price	£[illegible] ($249)	e-on Software	www.e-onsoftware.com	59	Rightly the best-selling landscape generator: very realistic results, and easy to master. New GI rendering is slow, however, and still no proper animated water	9
VUE 5 PRO STUDIO	Mac/PC	The Vue 5 Esprit core augmented by four add-on modules (also purchasable separately)	£274 ($499)	e-on Software	www.e-onsoftware.com	[illegible]	A well-rounded set of add-ons. Although some features should arguably be in the core app, *Mover* (Poser import) and *Botanica* (plant editing) are of real value	8
VUE 5 INFINITE	Mac/PC	Pro-level edition of Vue aimed at architectural and VFX work. Formerly known as Vue 4 Pro	£4[illegible] ($599)	e-on Software	www.e-onsoftware.com	66	Powerful, intuitive and configurable, Vue 5 Infinite leads where other landscape apps dare not follow. Relatively pricey, but capable of incredible-quality results	8
WORLD CONSTRUCTION SET 6	Mac/PC	Technical, but very powerful package well suited to tasks requiring real-world accuracy	£258* ($500)	3D Nature	www.3dnature.com	3	[Reviewed at version 5] A versatile and comprehensive landscape program, but the interface is unintuitive with a steep learning curve and no simple mode	8
WORLDBUILDER GENESIS	PC	A popular alternative to the Vue family: more powerful than Bryce, less technical than WCS	£92* ($179)	Digital Element	www.digi-element.com	57	Beautiful end results and fairly easy to use. Now very much optimised for 3ds Max, though, while [illegible]	7
WORLDBUILDER PRO 4	PC	Higher-end edition of WorldBuilder tailored to [illegible]	£360* ([illegible])	Digital Element	www.digi-element.com	57	A terrific program with many unique features, particularly for plant and water [illegible] fine detail, but [illegible]	7

TALKING POINT | Bryce is back

LAUDED BY THOUSANDS of artists – and butt of a thousand cruel jokes – *Bryce* has had a chequered history. Rescued from oblivion by new owner DAZ Productions, the venerable landscape-generation package has just received its first update in over four years, and ships at a budget-friendly sub-$100 price point. But can this old warhorse still compete with today's landscape apps?

Read our full *Bryce 5.5* review on page 86

COMPOSITING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AFTER EFFECTS 6 STANDARD	Mac/PC	One of the most popular desktop compositing packages, usable even for broadcast work	£[illegible] ($699)	Adobe	www.adobe.com	47	Updated video painting features, plus the addition of Photoshop's Liquefy tool make for a major upgrade. Still the same cluttered old interface, however	8
AFTER EFFECTS 6 PROFESSIONAL	Mac/PC	As After Effects Standard plus some high-end tools, worth investing in for professional work	£915 ($999)	Adobe	www.adobe.com	[illegible]	Motion tracking, enhanced keying and masking, particle systems and 16-bit colour space tools make this a better option than AE Standard for serious work	8
COMBUSTION 4	Mac/PC	Autodesk's own desktop compositor, unsurprisingly often teamed with 3ds Max	£[illegible] ($[illegible])	Autodesk	www.autodesk.com	65	Very strong basic tools, well-organised workflow and good compatibility with 3D apps, but poorer editing app integration and a relatively steep learning curve	9
DFX+ 4	PC	Cut-down, modular version of *Digital Fusion*, much beloved of PC-based LightWave artists	Priced by module	eyeon Software	www.eyeonline.com	43	Most of the improvements in version 4 are cosmetic, but still a powerful, affordable node-based compositing app. Good visual effects and 3D tools	8
DIGITAL FUSION 4	PC	One of the first PC-based desktop compositing packages, but still relatively little known	£[illegible] ($4,995)	eyeon Software	www.eyeonline.com	43	Not limited to 8-bit colour space, unlike [illegible], making this a powerful and underrated PC-based compositor, capable of scaling to film-quality work	8
SHAKE 3.5	Mac/Linux	Powerful node-based desktop compositor [illegible] effects	£2,00[illegible] ($[illegible])	Apple	www.apple.com	54	The most powerful desktop compositor on the market, with the possible exception of Digital Fusion. Version 3.5 adds long-awaited morphing tools	8

CAMERA TRACKING AND MATCH MOVING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D-EQUALIZER 3	Mac/Linux	Venerable (and Oscar-winning) tracking package, still widely used for film effects	On request	Science-D-Visions	www.3dequalizer.com	N/A	[Not previously reviewed in *3D World*]	N/A
BOUJOU 3	Mac/PC/Linux	One of the first major alternatives to 3D-Equalizer, popular in the effects world	£5,190* ($10,000)	2d3	www.2d3.com	54	Version 3 is still a powerful tracking package, but this much-delayed and largely underwhelming update may prove a disappointment to long-term boujou users	6
BOUJOU BULLET	Mac/PC/Linux	Cut-down, wizard-driven version of boujou intended for small to medium sized facilities	£1,307* ($2,500)	2d3	www.2d3.com	64	Aimed at smaller post facilities, bullet has good basic 2D and 3D tracking and accepts any resolution footage, but can prove unreliable with zoom shots	7
MATCHMOVER PRO 3.1	Mac/PC/Linux	Another of the old guard of desktop tracking applications, recently reduced greatly in price	£2,062* ($3,500)	RealViz	www.realviz.com	63	A nicely evolved version of the software, with powerful 2D and 3D tracking tools. No optical flow facility, however, and the mo-cap module costs a lot extra	7
PFHOE	Mac/PC	A powerful low-cost DV tracking application, named by *3D World* readers (see issue 6[illegible])	£49 ($94)	The Pixel Farm	www.thepixelfarm.co.uk	62	With fast and robust auto-tracking, *PFHoe* is great value for money and ideal for its target audience of aspiring digital filmmakers and independent artists	9
PFMATCHIT	Mac/PC	PFTrack's younger sibling, offering a useful range of tracking tools at an entry-level price	£600 ($1,160)	The Pixel Farm	www.thepixelfarm.co.uk	[illegible]	Great price, although only broadcast-resolution footage in AVI and QT formats is supported. Good user control in version 1.5, but no proxy-resolution tracking	8
PFTRACK 3	Mac/PC	First of a new generation of lower-priced broadcast-quality camera tracking packages	£[illegible] ($5,000)	The Pixel Farm	www.thepixelfarm.co.uk	66	Fast, powerful and now boasting true object tracking, *PFTrack 3* is arguably the most complete, and completely useful, tracking system currently available	9
SYNTHEYES	PC	Astonishingly affordable new all-round tracking package winning good word of mouth	£180* ($[illegible])	Andersson Technologies	www.ssontech.com	45	An incredible range of tools for the price. Outperforms costlier rivals on many tasks, but workflow can feel cumbersome [illegible]	9

WEB 3D AND MULTIMEDIA

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ANARK STUDIO 3 [illegible]	PC	Established authoring package for interactive 3D presentations	[illegible] ($3,499)	Anark	www.anark.com	64	A powerful solution for large-scale, real-time 3D, but the new higher price and absence of Mac support will leave some existing users high and dry	8
AXELEDGE 2 [illegible]	Mac/PC	All-in-one authoring and online animation package, described as like *Flash* in 3D	£309* ($550)	[illegible]	[illegible]	[illegible]	Powerful all-round authoring package with good animation and interaction editing tools. Import and export options much improved since version 1.0	8
CULT3D [illegible]	Varies	Free software suite for exporting *3ds Max* and *Maya* models in interactive online format	Free	Cycore	www.cycore.com	[illegible]	[Reviewed using the *3ds Max* exporter] Relatively straightforward to use, with a good range of options in the exporter. Very much more stable in recent builds	7
DIRECTOR MX 2004	Mac/PC	De facto standard for authoring multimedia CD/DVDs, now incorporating simple 3D tools	£[illegible] ($[illegible])	Macromedia	[illegible]	[illegible]	Greatly improved layout, but few new 3D tools since version 8.5. Havok physics and useful web output tools, but programming needed for complex effects	7
QUEST3D 2.1 ENTERPRISE	PC	Real-time 3D authoring tool, also available in cheaper *Lite* and *Professional* editions	£[illegible]035* ($[illegible])	Act-3D	www.quest3d.com	48	Full-featured all-round authoring app but fairly easy to master: no programming required. Can become unmanageably cluttered on complex projects, though	8
SWIFT 3D 4 [illegible]	Mac/PC	3D-to-vector graphics conversion tool: one of the most regularly updated interactive 3D apps	£97* ($[illegible]89)	Electric Rain	[illegible]	56	No major new tools, but several key usability tweaks see this 3D-to-Flash app maturing as a package. Generates simple animations quickly and painlessly	9
WIREFUSION 4 ENTERPRISE	[illegible]	Visual authoring tool for interactive 3D content, also available in cheaper [illegible]	[illegible]	Demicron	www.demicron.com	56	Straightforward all-round authoring solution: no need for programming or specialist plug-ins to view output. Slightly unorthodox, but quick to master	8

OTHER TOOLS

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D S.O.M. [illegible]	PC	Image-based modelling software: one of the newer, less expensive additions to the market	[illegible]	Creative Dimension Software	[illegible]	[illegible]	Requires photos of an object against a marked grid like *D Sculptor* or *iModeller*, but offers greater automation and can use uncalibrated images for texturing	8
D JOINER [illegible]	[illegible]	Photo-stitching software: less widely known than *Stitcher*, but suitable for many projects	£[illegible] ($[illegible])	[illegible]	[illegible]	[illegible]	In good hands it does what it's meant to do. But it suffers from poor stability and a lack of automated features. Documentation is disappointingly sparse, too	7
D SCULPTOR 2 STANDARD	PC	Image-based modelling software: another mid-priced package aimed at home users	[illegible]	D Vision Works	[illegible]	[illegible]	[Reviewed at version 1.1] A good tool for creating 3D models from images, and cheaper than *ImageModeler*. Much slower and not as powerful, however	8
DEEP EXPLORATION 3.5	[illegible]	File conversion software capable of handling a wide range of file formats, including CAD	£[illegible] ($[illegible])	Right Hemisphere	[illegible]	[illegible]	Well-designed model viewer, file conversion and asset management utility. Includes basic 3D model editing tools, rendering and Shockwave output	8
FRAMEFORGE 3D STUDIO	Mac/PC	Storyboarding software: [illegible] apps aimed at pre[illegible] and 3D storyboarding	[illegible]	Innoventive Software	[illegible]	[illegible]	Extremely easy to use, and scales to even high-budget [illegible] only available as add-on packs, though, and complex scenes can be sluggish	9
IMAGEMODELER 4	Mac/PC	Image-based modelling software: one of the earliest desktop photogrammetry packages	£713* ($[illegible])	Realviz	[illegible]	[illegible]	Gives professional quality results and can cope with architectural [illegible] objects, but requires considerable user input. Quality also comes at a price	7
IMODELLER 3D 2.x WEB	Mac/PC	Image-based modelling software: creates 3D models for online use, in a Java-based format	[illegible]	[illegible]	[illegible]	[illegible]	Like the pro version but cheaper. With the right objects, this can produce quite impressive results. Wait until the release of version 3, which supports [illegible]	6
IMODELLER 3D 2.x PRO	[illegible]	Image-based modelling software: all-purpose app, exporting to a range of 3D file formats	£[illegible] ($675*)	[illegible]	[illegible]	[illegible]	Impressive and more powerful than its main rival, *D Sculptor*. It has too many limitations. It may be easy to learn, but it's quirky and frustratingly unstable	6
NUGRAF 4.x	PC	File conversion software: powerful, with support for batch conversion and CAD data	[illegible]	Okino	[illegible]	[illegible]	[Reviewed at version 4] This affordable package performs a demanding task [illegible] well and is relatively affordable. User interface is a tad dated	8
PARTICLEILLUSION 3	Mac/PC	Particle software: generates 2D-style effects in [illegible] niche, but used on many pro projects	£[illegible]* ($[illegible])	[illegible]	[illegible]	[illegible]	A fast, flexible alternative to conventional 3D particle effects, and fits well into production pipelines. Would be improved by more specific forces and user control	8
POLYTRANS 4	PC	File conversion software: cut-down version of *NuGraf*, lacks batch conversion [illegible]	[illegible]	Okino	[illegible]	[illegible]	[Reviewed at version [illegible]] Not your everyday 3D program, but a very useful one [illegible] Conversion doesn't always run smoothly	7
REALFLOW 3	Mac/PC/Linux	Fluid simulation software: the current market leader for realistic fluids, used in film projects	£[illegible] ($[illegible])	Next Limit	[illegible]	[illegible]	Sets the benchmark for power and controllability for fluid simulation systems, but at a price. Still some stability and UI issues, particularly in the Mac version	7
STITCHER 4.x	Mac/PC	Photo-stitching [illegible]: the leader in its field, though similar tools are now [illegible]	[illegible]	Realviz	[illegible]	[illegible]	Incredibly powerful and versatile. Not a quick solution, but [illegible] the [illegible] quality of [illegible]	7
STORYVI[illegible]	[illegible]	Previsualisation software: the latest in a new [illegible]	£1,359*	[illegible]	[illegible]	[illegible]	Far more flexible and open-ended than simple storyboarding apps, and includes [illegible]	8

CONTACT US | Have we missed anything?

THINGS CAN CHANGE very quickly in the world of 3D software. If you've spotted an error in this buyer's guide, please contact us at the email address below. However, before writing in, please bear the following points in mind:

1. All prices exclude VAT and shipping, plus any optional extra costs, such as printed manuals or maintenance contracts.
2. Asterisks denote currency conversions from a list price at the current rate of exchange when the entry was added to the buyer's guide.
3. Due to limitations of space, not all sectors of the 3D market can be covered each issue. We aim to vary our listings from month to month.
4. Space also precludes us from listing the thousands of plug-ins currently available.
5. The verdict column contains a synopsis of our last published review. In most cases this will refer to the current version of the software. Where this is not so, it should be clearly noted.

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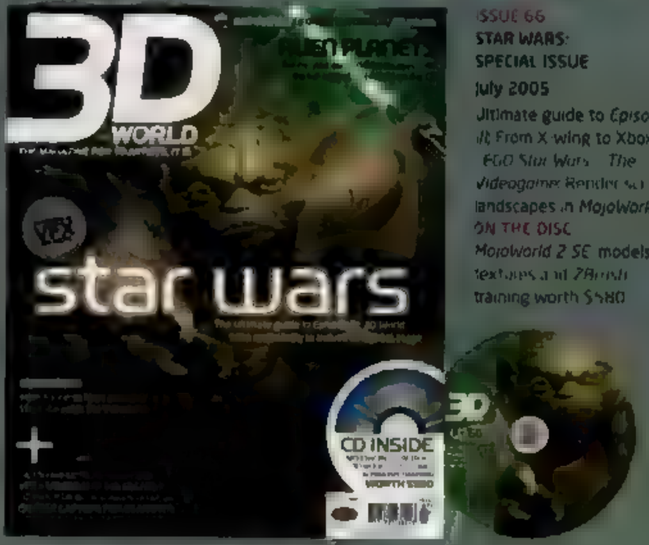
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studio profile

Useful information for 3D artists seeking work at visual effects companies. This issue: **Designhive**

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- London City Racecourse redesign plans

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TYPE OF WORK UNDERTAKEN
Designhive works independently for architects, urban masterplanners, interior designers and property developers to create realistic and inspiring visions of future built environments

NUMBER OF FULL-TIME EMPLOYEES
10

TYPICAL NUMBER OF FREELANCERS
The company rarely uses freelancers for animation or visualisation, although it does use 2-5 per year for other disciplines such as photography

TYPICAL NUMBER OF FULL TIME RECRUITS PER YEAR
2-5

LOOKING FOR USERS OF WHICH 3D SOFTWARE?
- *3ds Max*
- *Combustion*
- *boujou*

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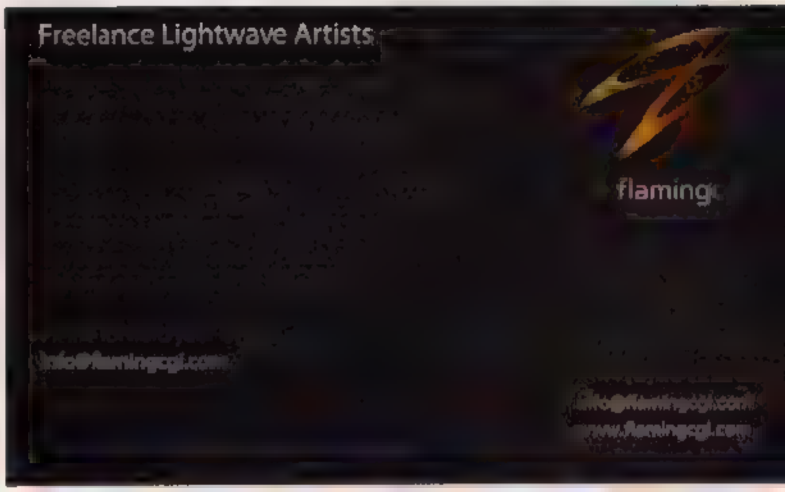
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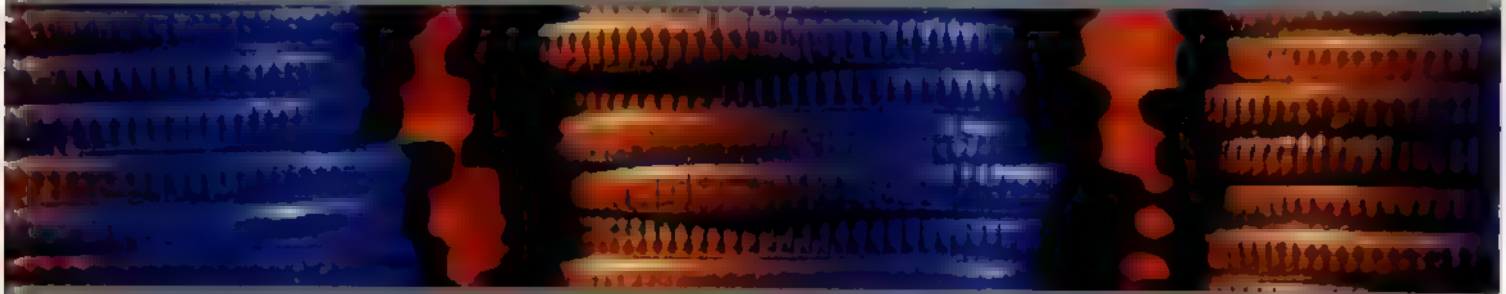

Each issue, our panel of experts answers the legal and financial questions of freelancers and small studios. This month ...

"They've stolen my design!"

[illegible] of occasions at industry events. In the past, he's accused me of having copied his work (without being able to prove that I've actually copied him). However, on this occasion, I feel sure that he's copied my work and I want compensation for what he's done. What should I do?

SARAH MONTROSE, VIA EMAIL

Oh dear. As a creative person who trades on originality, it's always upsetting when you see what is obviously your own handiwork copied by someone else without your permission. The first thing to be certain of is whether you have any rights in the work that's been copied. Copyright exists in all original literary, dramatic and artistic works. Design rights exist for designs that are not commonplace in their field, and which contain a degree of 'individual character'. Therefore, think about how you came up with the work and, depending on what it is, whether it falls into either of the categories of work described above.

Did you create the work together with anyone? If you don't already have your collaborator's person's permission to do so, you ought to ensure that you'll be supported in any action that you intend to take in relation to the work.

Once you have that, you need to consider the circumstances of the copying and therefore the infringement of the rights that you have. In general, whether in the UK or in the US, copyright is a negative right – in other words, copyright doesn't actually give you anything. For instance, can you show a series of facts or situations that would enable a judge to draw a reasonable conclusion that you had actually been copied? Is it beyond coincidence that, following an instance where you and the alleged plagiarist were side by side at a recent trade fair, he subsequently puts out material that is substantially similar? If the second work is not a copy of the first, despite similarities, it won't be considered an infringement of copyright.

In contrast, registered rights (designs, trademarks) give a monopoly right to the owner. Therefore, you don't need to demonstrate that the right was copied. It's enough that the 'copied' work is substantially similar for it to be an infringement.

A 'substantial' copy is based on quantative evidence. Put another way, there isn't a list of '10 things that must be copied or changed' before a work is considered to be a copy of another, or before it's not a copy of another work. If you can demonstrate that what's at the heart of your work has been copied, this could be sufficient to show that your rights have been infringed.

Next, get an example of the imposter's work. Photograph it, catalogue it and find out as much information as you can (the date it was first shown, sales figures and so on). Once you have all of this information, you should then consider contacting the company to register your displeasure. This should be done in writing (this comes in handy later), and you should provide details of how you feel your work has been plagiarised. Don't make any outright accusations at this stage.

Often, the infringer will ignore your letter and you'll have to refer the matter to a lawyer. If so, act quick! If you're slow to react, you may not be able to obtain an interim injunction (an order temporarily restraining the plagiarist from doing something – for example, selling the work or simply displaying it in public).

A lawyer will write a 'cease and desist' letter on your behalf, setting out the nature of your claim and what you want the offending party to do (stop trading, deliver unto you the copied material). It can also specify the damages that you seek. Often, the matter will settle out of court, with the plagiarist agreeing to certain terms in exchange for you dropping your lawsuit. Your lawyer will provide you with specific legal advice, but you should consider all those things that you need the copyist to stop doing, so that you tie them in to an agreement. Also, is there anything else that you may want, such as the publication of an apology or public correction?

A meaningful settlement agreement should take into account all the needs and wants that you feel are relevant to the eventual 'deal' in order for you to feel comfortable about dropping hands and walking away. For example, are there any designs or work that you would also like to be the subject of such an agreement?

If you need to calculate your personal loss due to the act of plagiarism, you'll need to determine what you would receive for a licence of your designs (what the market would bear for the work), or an estimate of the profits that the plagiarist has made during the period of use of the infringed work.

Next time, I'll explain what you should do if you're accused of copying someone else's work.

OFTEN, THE INFRINGER WILL IGNORE YOUR LETTER ... ACT QUICK!

Lee Gage is an intellectual property solicitor at leading media and entertainment firm Harbottle & Lewis LLP. He advises creative businesses on all areas of IP and IT law issues.
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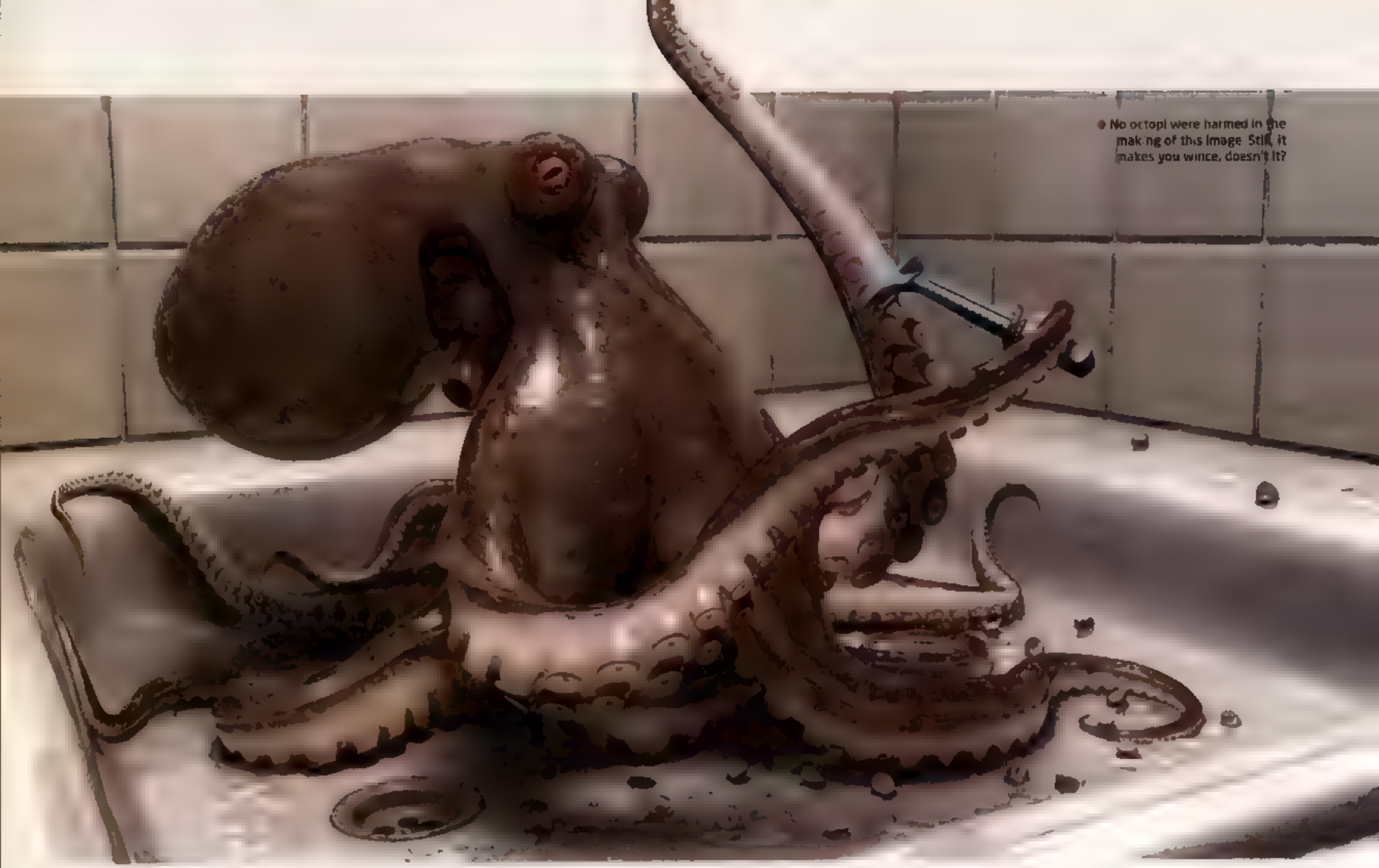


No octopi were harmed in the making of this image. Still, it makes you wince, doesn't it?

Thomas Mangold

An octopus is a complicated creature to model - particularly if you have to show it shaving! We talked to artist Thomas Mangold to discover how he created this self-mutilating cephalopod for a Sony ad spot

BY BEN VOST

The octopus, viewed from all sides in Layout. With all the weight maps, it came in at over 100MB for the object alone

Tell us a bit about yourself

I'm a German-based photographer in my mid-40s. [illegible] Communications at the University of Applied [illegible] where I specialised in stills, interior and outdoor photography. I now work as a freelance photographer and most of my work is done for magazines and agencies in the USA, France, the UK, Japan and of course Germany. My main interest at the moment lies in the combination of traditional photography and CGI in order to create outstanding images.

When did you see LightWave 3D for the first time?

Way back in the 5.6 days. A new professor at our university arranged a compact seminar introducing students to the world of 3D, using *Strata StudioPro 1.75*. This was back in [illegible] and I used the software for quite a while. I also tried out *Cinema 4D* for Mac users, those were [illegible] days [illegible] *LightWave* crossed my path. Somehow [illegible] 3D software has always been a bit confusing for me and the clean separation between Layout and Modeler in *LightWave* looked convenient.

When did you first start using it?

I had the opportunity to play around with it from time to time but finally decided to jump on the train in 2002 with *LightWave 7.5*.

What do you like about the package?

You're able to get things done pretty fast, even as a beginner. Instead of being confronted with loads of confusing icons, the text editor style is quite self-explanatory and creating a great model is no problem. While you get frustrated from time to time because you realise that you're working inefficiently, you then discover that there's already a command that does exactly what you needed. Your models or animations don't necessarily get better the longer you use *LightWave*, but your workflow improves, and that's one of the most important issues if you want to work professionally.

What spec machine(s) are you using it on?

I own several PCs to do the render jobs. There are 2.6GHz, 2.8GHz and 3GHz desktops, and a 2.8GHz notebook. All of these are simple consumer products with no extras, apart from 1GB of RAM each.

● Part of the extensive research material. So what *is* the best way to recreate an octopus in 3D?

In your opinion, should LightWave 3D stay separated or become integrated?

I like it the way it is, probably because it resembles the way I work as a photographer. You get your props and/or models, finish your pre-production and then you go into the studio or on location and shoot your images. However I'd ask for something like a make-up artist or stylist in Layout. You should be able to paint vertex maps or move points or polygons to apply small changes to your models.

What was your octopus picture for?

The octopus is for an advertisement for the PlayStation 2 game *Winter Air Games*. The slogan is *'Préparez-vous à plus de glisse'* – prepare yourself to maximise your gliding (skills)

Where did the idea come from?

It came entirely from a friend of mine who works as an art director for [ad agency] TBWA\Paris. He had the image in his mind already but didn't know how to realise it. A traditional model-maker would have been the other possibility. Anyway, he asked me if I would like to give it a try. I really needed to convince him and the creative director that it could look real and not fake. That's probably a problem in the 3D community because a lot of users lack a certain feeling for lighting, image composition and interesting topics

What research did you do to get the texturing and modelling right?

In the beginning, the internet and my local library were my main resources. To my delight, I managed to find a book on cephalopods, which had hundreds of species. Actually, this made me realise that there isn't anything like one 'look' – each specimen looked different in terms of the colour and the colour pattern. That's due to the fact that an octopus can change its colours by contracting or expanding small muscles on its skin.

As an octopus is quite a flexible being (some big fellows can suck themselves into a soda can), I felt at one point that I needed to get the real thing into my hands to enhance my model. The local fish market finally provided me with a 2kg-heavy, deep-frozen fellow. Dissecting it to scan the different parts was quite an experience. My art director also bought one, but after a small photo session to provide me with more reference images, his wife prepared a lovely meal with their octopus. Somehow I couldn't follow suit

What was the hardest thing to model?

The arms – not because they're difficult to model, but they slow down your computer so much. There are more than 100 suckers on each one, and quite a lot of them are tiny and positioned near the tip. Although they're pretty small, you can see them, so I couldn't cheat. As there are quite a lot of weight maps for the texturing applied, the final file size was around 100MB, so working with the final model was almost impossible. A dummy with no suckers helped me to find the right pose in Layout

How long did the project take from concept to finished art?

More than six weeks. That sounds like a pretty long time, but if you're running a one-man show, doing the research, modelling, texturing, rigging, lighting and rendering all on your own, those six weeks are gone instantly. The further you get with the project, the slower it gets. The feedback is getting worse, the test renderings take longer and the bone deformation is far from real-time feedback. Also, the agency needs to look at the tests.

Did you have any help with it?

I did work with one great art director, Philippe Taroux. He couldn't help me with any of the 3D stuff, but he supported me to a great extent with the research. During the project, he came up with precise suggestions about how he wanted the octopus to look, but was always open-minded to all of my ideas. And, as I said, he bought an octopus for me, and shot a lot of the research images

Also, the forums out there were an important source of support for me too. Some problems I ran into couldn't have been solved without the kind knowledge of some *LightWave* user who had encountered the same dilemma before but found the solution

What are you working on now?

I've just finished two projects, again with animals (a giraffe and a horse), a 'real'-looking character and loads of props. While the work on the giraffe was pretty easy, the guy on the horse took some time because I needed to model all the accessories a jockey needs, the horse and the jockey himself. Because I didn't just want a CG image, the background and HDRI lighting references were shot on location. Composing everything, and matching colours and contrast, has been quite a lot of fun. ●

● Another reference image: even large octopi are able to squeeze themselves into small spaces, thanks to their lack of bones

● There was also much deliberation about the best way to light the octopus in order to show off the 'slimy' nature of the beast

● In contrast, one of Thomas's latest projects shows very large animals looking out of place. The images are for Zeiss binoculars

ABOUT THIS ADVERTORIAL

This story was created by NewTek Europe in partnership with *3D World* magazine. Read the full version in the Community section of the NewTek website

[w] www.newtek-europe.com

Making The Mantis Parable Part Three

Cyan Worlds' Josh Staub chronicles the highs and lows of creating an independent animated short, and assesses what lessons his experiences hold for others

BY THE SUMMER OF 2004, progress on my independent animated short film *The Mantis Parable* had become slow and difficult. My hours at work had increased, leaving less time for my family and almost no time to work on the film, not to mention that Act II was turning out to be the most complex piece yet.

FIRST PASS

I had completed a first pass of the intro and Act I, but Act II introduced the mantis character, which meant animating both the mantis and the caterpillar in every shot. My lack of equipment was becoming a paralysing factor as well. My 512MB RAM just wasn't cutting it and my 80GB HD was filling up rapidly. Overnight renderings were routinely taking 300-500MB, and my habit of incrementally saving *Max* files a couple times a night wasn't helping either. I purchased an extra 1GB RAM and a 160GB internal HD to stop the bleeding, knowing I would need more... and soon.

IF 1280 RES IS GOOD ENOUGH FOR THE ACADEMY, THEN IT'S GOOD ENOUGH FOR ME

In October 2004, I found a source of motivation. Earlier that year in an interview with CGChannel.com, I had committed to having a 'first pass' of the film completed by the end of autumn, and I recommitted myself to reaching that goal. I began spending a couple more nights a week working on the film and, by November, had finished Act II. Act III (the final act) progressed very quickly, primarily because I had become more comfortable animating, but also because my sense of pacing had greatly improved. In other words, I was making less mistakes!

For 24 hours a day, if I wasn't animating, my machine was rendering. Every night I would prepare a series of renderings before I went to bed, a new set in the morning, a new batch at lunch (I live just two miles from work) and occasionally one before dinner that would complete just as my family went to sleep. Three or four hours of late-night animating and the process would begin again. And so it went on, until 21 December. As the last leaves fell from the trees, I recorded a few short pieces of music based on my original intro theme, threw in some temporary sound effects, and burned a DVD. For Christmas we were visiting family and I would have a completed first pass of *The Mantis Parable* in hand.

Showing the first pass version of the film to family and friends was incredibly encouraging, but most importantly I was able to extract from their comments a handful of things I felt were worth tweaking. A few days later I returned home motivated to begin work on the final version of the film. Several important festival submission deadlines fell on the last day of February and I'd spend every late night over the next two months attempting to reach that goal.

FINAL PUSH

Before I rendered any final images, I needed to settle on a resolution. At first glance, TV/DVD resolution (720x480) made a lot of sense. If I ever wanted to sell the film, DVD format would obviously be the way to go, and DVDs are commonly used as festival 'screeners' (the version viewed by judges to determine a film's acceptance into the festival). For exhibition, some festivals require DigiBeta or BetaSP (also 720 pixels wide), however, others prefer HDCam (1920 pixels wide) and a select few require film (35mm or 16mm). To qualify for an Academy Award, only short films with a native resolution of at least 1280 are accepted. I'd originally rendered the first pass of the film at 1024x554, so 1280 wasn't much of an increase, and while the chances of *The Mantis Parable* winning an Oscar are slim, if 1280 is good enough for the Academy it's good enough for me! So, I settled on 1280x693 for the resolution for the film.

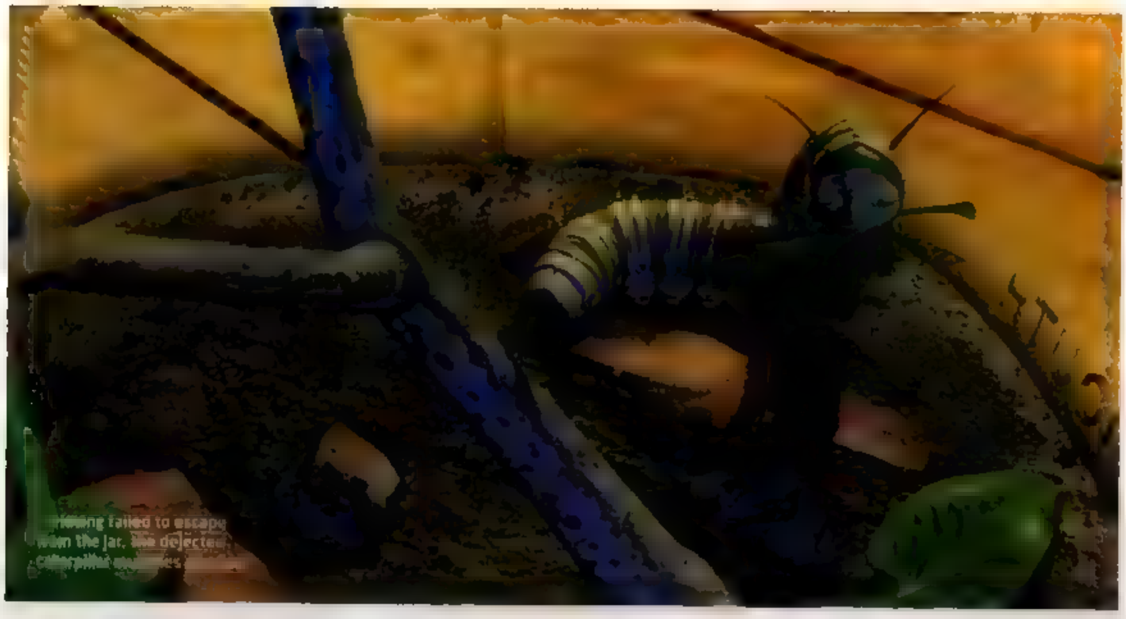
The biggest decision I made was to render the film at 24 frames per second (fps), which is film speed, instead of 29.97, which is NTSC video speed. Making the conversion in *3ds Max* is as simple as modifying a couple of scene preference parameters. However, reducing the film from 30fps to 24fps would mean squashing my thousands of keyframes into a smaller range of frames which meant

PRODUCTION COSTS THIS ISSUE

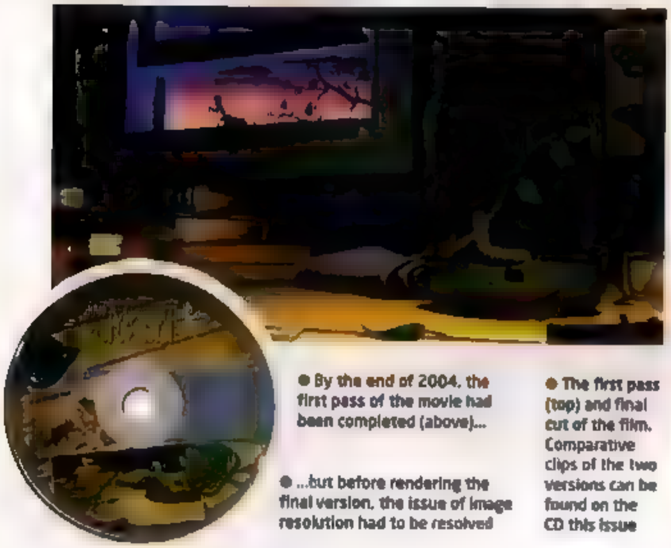
SOFTWARE
- Adobe *Encore* $175

HARDWARE
- Additional 1GB RAM $170
- Refurbished Dell 3GHz P4 with 1GB RAM $675
- 160GB internal HD $100
- 240GB LaCie external FireWire HD $210
- 2 MXL condenser microphones for sound foley $100

TOTAL SPEND: $1,430
ALREADY SPENT: $2,989
RUNNING TOTAL: $4,419



Having failed to escape from the jar, the dejected caterpillar [illegible]



● By the end of 2004, the first pass of the movie had been completed (above)...

● ...but before rendering the final version, the issue of image resolution had to be resolved

● The first pass (top) and final cut of the film. Comparative clips of the two versions can be found on the CD this issue

that many would no longer be 'whole-numbered' but would instead fall between frames, which can be a bit confusing to deal with. However, my new 24fps clips would be the same time length as the 30fps versions, but would take less time to render because of the 20 per cent less frames. In other words, a three-second clip at 30fps would mean 90 frames to render while the same three-second clip at 24fps would require rendering just 72 frames. A 20 per cent decrease in rendering time was a major plus.

Last but not least, I needed a major equipment upgrade. Rendering over 13,000 frames in two months on one machine was a practical impossibility. I was also going to need a hell of a lot more hard disk space to hold all of the final high-resolution rendered frames. Out of desperation, I purchased a refurbished Dell Pentium 4 PC, an external LaCie FireWire HD, and Adobe *Encore* to create and burn the festival submission DVDs. In addition to my two PCs at home, I rendered clips on two machines at work overnight and on the weekends. Efficiently managing four rendering machines while making final adjustments to the film was a major project on its own. I had to make sure I was super-organised, so I decided to keep a detailed spreadsheet in a ring binder with me at all times in order to keep track of everything.

For those final six weeks, my life seemed like a blur. I spent every moment of my spare time tweaking animation, lighting, cameras, recording music and sound and setting up renderings for the final pass. I tried very hard to find quality time to spend with my family but I'm sorry to say that even when I was physically present my mind was often on the film. Finally, on the night of 18 February 2005 (almost two weeks early) *The Mantis Parable* was finished. I burned a DVD, walked down the steps to my basement and watched the final version of my film.

Of course, there will always be things I wish I had more time to work on: animations to perfect, lighting to tweak, for example, but I was so proud of what I had accomplished and I knew it was time to call it a wrap. And it was time to see what the world thought of *The Mantis Parable*.

NEXT ISSUE: Finally complete, *The Mantis Parable* is unveiled to audiences at film festivals across the world

TIMELINE

OCTOBER 2004
Act II completed. Only two months left in order to reach 'first pass' deadline by the end of December

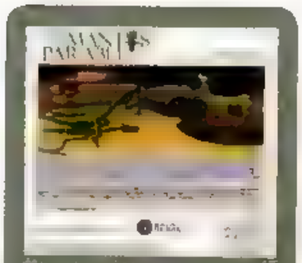
NOVEMBER 2004
Animation of Act III (the final act) begins

DECEMBER 2004
First-pass visuals and animation of the film is completed on time, on 21 December. Purchase of two condenser microphones, enabling recording of temporary sound foley and music. First-pass DVD of the entire film is created for viewing over New Year break

JANUARY 2005
Rendering resolution of 1280x693 is finalised, and tweaking of all phases begins for final pass. After some festival research, the end of February is targeted for completion of *The Mantis Parable*. Surprisingly enough, by the end of the month, all final renderings for the film are complete and visuals are then assembled

FEBRUARY 2005
Final music is written and both sound foley and music is recorded. On 18 February, the film is complete. Within days of completion, *The Mantis Parable* DVDs are submitted to ten upcoming festivals

NEXT ISSUE
***The Mantis Parable* bursts onto the festival circuit and finally proves its worth as a challenger on the short-film world stage**



SEE THE MANTIS PARABLE

● Updated festival screenings, a production diary and other technical information relating to *The Mantis Parable* can be found online at the URL below. An exclusive clip from Act II with artist's commentary can be found on this issue's CD (see page 115)
www.themantisparable.com

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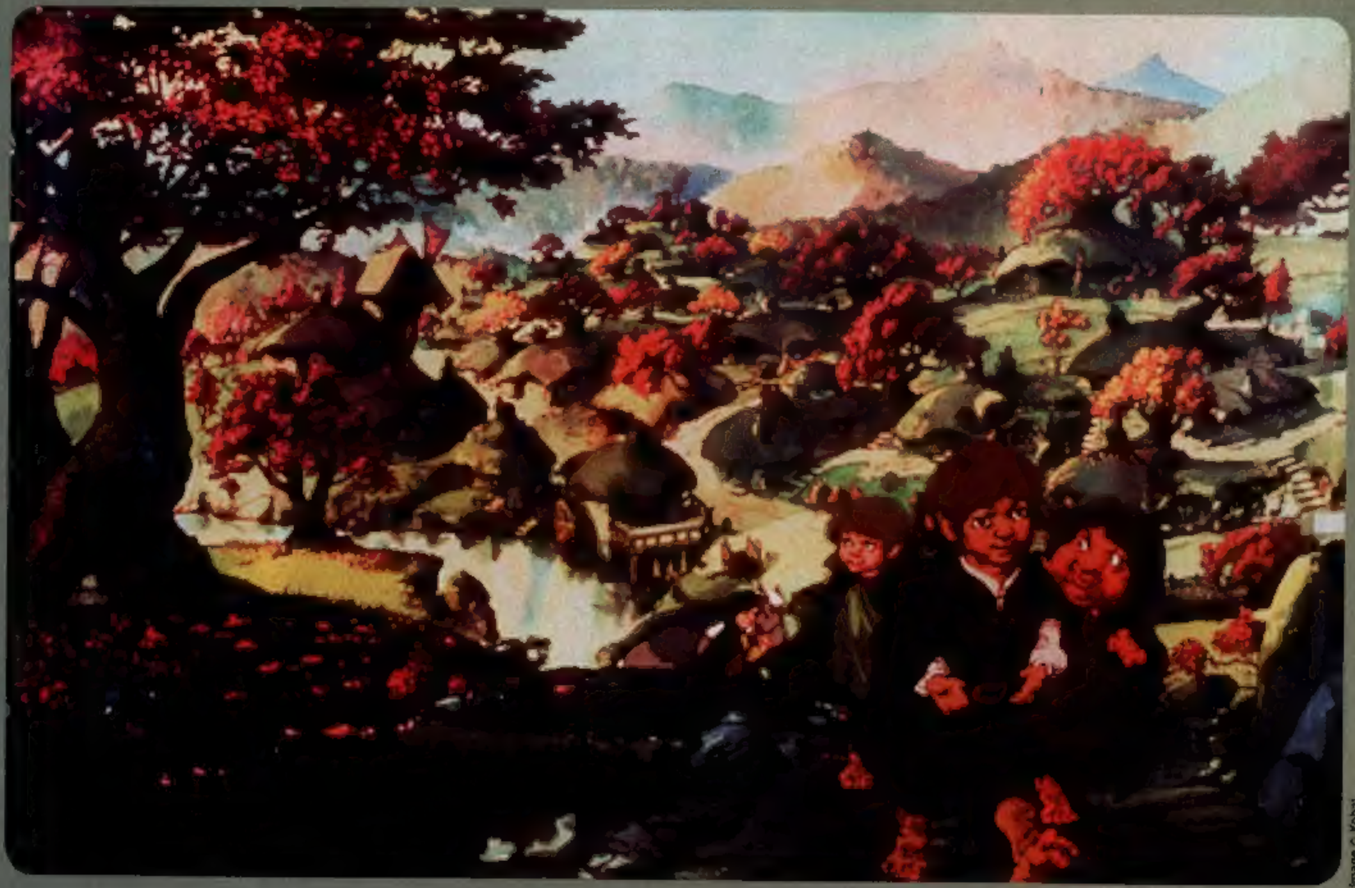


Image © Kobal

Hobbiton, as it appears in Ralph Bakshi's *Lord of the Rings*. "It anticipates the Peter Jackson movies," says Lombardi. "Tolkien's writing is so descriptive: give it to two artists and they're bound to draw it in similar ways."

INSPIRATIONS

Freelance TD **Kevin 'Bubba' Lombardi** shares his respect for the 'other' Lord of the Rings – maverick director Ralph Bakshi's 2D version

"**FANS OF ANIMATION** can get burned out on the cutesiness of conventional Disney stories, but Ralph Bakshi was anything but conventional. I saw my first Bakshi movie when I was 12, and when *Lord of the Rings* came out, I was 15. In between, I'd read the book and got hooked on fantasy literature – and I mean hooked. There was no way I wasn't going to see the film.

The character that really stands out in my mind is Gollum. He's actually quite similar to Peter Jackson's version: hunched-over, cranial, with large eyes that glow in the dark. He's funny, too – we even nicknamed one of my friends Smeagol after seeing the film.

It seems strange to me that Bakshi got blasted for his use of rotoscoping in the movie - Disney used roto for years, dating back to *Sleeping Beauty* - but there was something new about what he did with it. It doesn't always work – the orcs are effectively film footage that has been colourised and painted, and it doesn't sit seamlessly with the rest of the film. But when it does, in some of the ringwraith scenes, the whole look is lovely.

Lord of the Rings isn't a neglected masterpiece – the animation is uneven, and in its primary purpose, which is to tell Tolkien's story, it falls short: it ends at Helm's Deep. But it's definitely a cult classic, and one that put Bakshi on the map. People today tend to forget that he produced four or five films that became well-known titles. How many other animation directors can say that?"

A CalArts animation graduate and former Alias staffer, Kevin 'Bubba' Lombardi was Effects TD and Layout Artist on the recent full-length 3D movie *Valiant*
[w] www.bubbakev.com

The Lord of the Rings

SEE FOR YOURSELF
Released in 1978, *Lord of the Rings* was Bakshi's fifth major animated movie, following the cult classics *Wizards* and *Fritz the Cat*. The movie is available on DVD from Warner Home Video

endorphin 2 LE

Exclusive trial version

PC ONLY Create death-defying stunts without keyframe animation with this powerful motion-synthesis package

AVAILABLE FOR THE first time on a magazine CD, *3D World* is proud to present the new trial version of this powerful 'dynamic motion synthesis' package. Used on projects ranging from *Lord of the Rings: Return of the King* to *Tekken 5*, endorphin is fast becoming a standard tool at major game and effects studios throughout the world. It's also, in the words of one *3D World* contributor, "quite possibly the most fun you can have in a studio while remaining in a legal state of mind."

The software effectively enables you to create your own motion capture data, even for stunts that would be too life-threatening ever to perform in the real world. Just apply forces and collisions to endorphin's virtual stuntmen and let the AI do the rest. No keyframe animation required!

In this learning edition of the software, Motion Data Export is disabled, but Import, Save and Video Export are still available. In our accompanying tutorial, which starts on page 42, animator Chris Ollis introduces the main features of the application, while his virtual characters meet with a series of ever more bizarre and painful accidents – purely in the name of education, of course.

www.naturalmotion.com

FACTFILE

FORMAT	PC only
MINIMUM SYSTEM	Windows 2000 / XP, 1.7GHz Pentium or Athlon processor, 512MB RAM, GeForce 2 or Radeon 7000 graphics card
DEVELOPER	NaturalMotion
WEBSITE	www.naturalmotion.com

USING THE CD

GETTING STARTED
On a PC, this CD should auto-run when inserted into your CD drive. If not, run 3dw.exe. To toggle autorun on and off, use the Control Panel on your computer. On a Mac, choose 3DWIClassic or 3DWiOSX to suit your operating system.

USING THE INTERFACE
The disc interface requires Windows 98, Me, 2000, XP or Mac OS 8+. You'll also need an active internet connection to make full use of the interface. For best results, ensure you're using a version 3 web browser or better.

POINTS TO NOTE

- Some software may require free registration over the internet or by phone
- Some software may not be available in all territories
- Values quoted are the original prices for which the software was sold (including packaging and manuals).

ArchVision RPC files

Rich Photorealistic Content

PC / MAC A library of render-friendly stock content for your 3D scenes: worth $325

ARCHVISION'S Rich Photorealistic Content (RPC) provides artists with a simple method of incorporating complex objects into 3D environments. RPC allows architects, illustrators and other graphics professionals to quickly add detailed objects, such as human figures, to their virtual environments without sacrificing render times or having to master complex new software. Since the files are based on photographic image data, with only minimal polygonal geometry, the level of detail and quality of image can surpass that achievable through normal 3D modelling.

RPC technology has been integrated into a wide range of industry-standard applications, including *Autodesk VIZ*, *3ds Max*, *Piranesi* and *MicroStation*. This allows the user to take full advantage of the power of *RPC* with no additional software. The technology is currently supported via plug-ins for *Maya*, *Cinema 4D R9*, *LightWave* and *Photoshop*. These plug-ins are not included on the CD, but are available via the ArchVision website. (Please note: some plug-ins are paid-for downloads.)

For more information, visit the 'What is RPC?' webpage at www.archvision.com/WhatisRPC.cfm. The CD includes a selection of *RPC* content worth $325, including four characters, a car, a chair and three plants.

www.archvision.com

FACTFILE

FORMAT	PC / Mac
MINIMUM SYSTEM	See website below for details
DEVELOPER	ArchVision
WEBSITE	www.archvision.com

Digimation model

As sold for $695

CARRARA A high-quality model of a 1970 Austin Mini Cooper car

TO ACCOMPANY Mike de la Flor's Carrara Q&A, which can be found on page 72, Digimation has kindly supplied this high-quality stock model, provided in .car format, and usually sold for $695. One of the world's leading suppliers and developers of plug-ins for *3ds Max*, *Maya* and *Softimage XSI*, Digimation is also the exclusive distributor for Viewpoint's Premier 3D model collection.

www.digimation.com

1970 Austin Mini Cooper 3D model provided by Digimation

FULL CD CONTENTS | What's on the 3D World disc this issue

VIDEO TUTORIALS

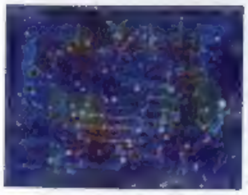
BOX MODELLING IN SILO

Seven supplementary videos comprising 119 minutes of video training, recorded for the CD by well-known artist and regular *3D World* contributor, Glen Southern. The videos cover the creation of the head of the monstrous character above using standard box modelling techniques in *Silo*, and are supplied by 3D training company KURV studios. Note: *QuickTime* is required to view these movies

www.kurvstudios.com

LEAD CONTENTS

ENDORPHIN 2 LE (EXCLUSIVE)
ARCHVISION RPC CONTENT WORTH $325
DIGIMATION MODEL WORTH $695
For full details, see facing page



OTHER RESOURCES

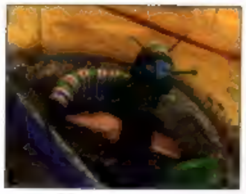
50 TEXTURES

Seamlessly tiled JPEG images of flooring, natural surfaces and other common materials, including several bump maps. The files are supplied by resource provider NOCTUA Graphics. These textures are licensed for use in commercial projects

www.noctua-graphics.de

CD MISSING?

For a replacement, please contact your newsagent



DIARY OF A SHORT

Two exclusive excerpts from Josh Staub's short film, *The Mantis Parable*, with artist's commentary, as featured in the magazine this issue

Full article: page 110

SUPPORTING FILES

Full-size screenshots, project files and other resources to accompany the tutorials and Q&As printed in the magazine this issue

Magazine contents: page 4

TROUBLESHOOTING

THIS IS A FUTURE TECHNOLOGY CD-ROM. This disc has been thoroughly scanned and tested at all stages of production, but – as with all new software – we still recommend you run a virus checker before use and have an up-to-date backup of your hard drive. While every effort has been made to keep this CD virus-free, Future Publishing Ltd cannot accept responsibility for any disruption, damage and/or loss to your data or computer system that may occur while using this CD or the programs and data on it. Consult your network administrator before installing software on a networked PC.

If you are having difficulties using the interface or content, please visit Future Publishing's reader support website at **www.futurenet.co.uk/support**. On this regularly updated site, you'll find solutions to many commonly reported problems. If you still experience difficulties, please email our reader support team (**support@futurenet.co.uk**) or call **+44 (0) 1225 442244** and ask for coverdisc support. Please note that we can only provide technical support for the installation of software. Unfortunately, we cannot give in-depth help on the applications included on this CD, or on your hardware or operating system. For software support-related issues, please contact the relevant product's developers. We also regret that we are unable to provide serial numbers over the phone. Future Publishing can only provide technical support for this cover disc for a period of six months after this magazine's on-sale date.

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